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Yorkshire Naturalists' Union

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Back cover: Black-tailed Skimmer *Orthetrum cancellatum* by John Bowers (see p 151)

Yorkshire Naturalists' Union

The Naturalist

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Editorial

The Editorial Board was created at the time of the merger of *The Naturalist* with the *Bulletin*. It has set itself some broad policy objectives, including:

(a) Broadening the YNU authorship base: that is, increasing the number of YNU members who write papers for the journal;

(b) Maintaining the scope of the two merged journals: that is, publishing articles that previously would have been seen as suitable for the *Bulletin* as well as traditional *Naturalist* papers;

(c) Giving more space to papers primarily addressing matters of species and habitat conservation.

As part of the strategy for meeting these objectives it was decided to invite affiliated societies to put together a part issue of the journal by commissioning papers from their members. This is the first outcome of that initiative and of what we hope will be a regular feature of *The Naturalist*; an issue with a local flavour. The affiliated society chosen for the first of these experiments is Leeds Naturalists' Club. Since this is the first of the series it is perhaps worth dwelling briefly on the results of the experiment. Eight individuals were approached, all of whom agreed to contribute papers. Six papers were produced by the deadline. One was published in the last issue of *The Naturalist* and the other five appear in this issue together with another unsolicited `Leeds' paper from a YNU member whose local society is not the Leeds Naturalists' Club.

In our judgement the experiment has been a success, meeting all three criteria listed above. Five of the authors have not previously written for *The Naturalist*. The papers cover a wide range of subjects: some would have easily fitted into the *Bulletin*; others are more obviously *Naturalist* papers. Because the boundaries between the two journals were never sharply drawn, some would have been suitable for both. Wildlife and habitat conservation issues feature in most of the papers and are the central theme of two of them. Taken as a whole the papers raise some broad questions about the importance of urban areas for wildlife that will be explored in a future issue.

We would welcome readers' views on the experiment and meanwhile would encourage affiliated societies to think about putting together a local issue.

John Bowers

A bird-ringing study of passerines associated with reed beds on and near the Humber estuary: results of the first year of monitoring*

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Abstract
Reed beds are important features of the Humber Estuary and are predominantly found throughout the inner estuary. They support breeding populations of priority conservation bird species including Bittern *Botaurus stellaris*, Marsh Harrier *Circus aeruginosus* and Bearded Tit *Panurus biarmicus*. The Humber Estuary reed beds are also important for breeding Reed Warbler *Acrocephalus scirpaceus*, Sedge Warbler *Acrocephalus schoenobaenus* and Reed Bunting *Emberiza schoeniclus*. Although a large proportion of the Humber reed beds are tidal, smaller and more fragmented reed beds are also found in areas of open brackish or fresh water beyond the sea wall (e.g. borrowdykes). This paper compares the composition of the bird assemblage at the Crabley Creek site (tidal reed beds) and the Oxmardyke Marr site (freshwater reed beds). Birds were captured using mist-nets and subsequently ringed, sexed and aged whenever possible. The first year of study showed Reed Warbler to be the most abundant breeding bird at both Crabley Creek and Oxmardyke Marr. Both reed bed sites also held a breeding population of Sedge Warbler, although this species was found in lower numbers. Whilst Bearded Tit was absent from the inland reed bed site at Oxmardyke Marr, it was common at Crabley Creek in the tidal reed beds.

Introduction
The UK contains c.5,000 hectares of reed beds, most of which are found on the coast of eastern England, where relative sea-level rise is predicted to lead to the loss of significant areas of this habitat. There are 381ha of reed communities on the Humber Estuary and, although visual ornithological monitoring is undertaken at Far Ings and Blacktoft Sands Nature Reserves, bird-ringing studies are very scarce across the Humber reed beds. As a result, little is known about the bird species associated with reed beds and, in particular, their population dynamics and the importance of this habitat during migration periods. A bird-ringing study was undertaken between April and August 2009 at two reed bed sites on and near the Humber Estuary: (a) Crabley Creek - an estuarine reed bed located in the upper Humber Estuary, and (b) Oxmardyke - an inland reed bed located within the Humber Estuary floodplain.

The objectives of this study are to determine the long term population dynamics of passerines associated with reed beds at the two sites and to assess the importance of the Humber reed beds for migratory birds, in particular *Acrocephalus* warblers. The target species at both sites are Reed Warbler *Acrocephalus scirpaceus, S*edge Warbler *Acrocephalus schoenobaenus* and Reed Bunting *Emberiza schoeniclus*, plus Bearded Tit *Panurus biarmicus* at Crabley Creek. The results of the first year of monitoring are presented in this paper with the aims of showing the composition of the bird assemblages at both reed bed sites and identifying temporal variation in adults and juveniles ringed at Crabley Creek and Oxmardyke Marr.

Study Area

The Crabley Creek site (53°43.89´N, 0°37.55´W) is situated on the north bank of the upper Humber Estuary (Figure 1). It is part of a large linear estuarine reed bed complex on the upper Humber North Bank totalling in excess of 96ha (Allen *et al.*, 2003). The area studied is immediately to the east of Crabley Creek and consists of a stand of c.2ha of reed beds. The Oxmardyke Marr site is further inland (53°44.60´N, 0°41.50´W), situated immediately adjacent to the Market Weighton Canal, 3.75km from the nearest point on the Humber Estuary and 4.5km from the Crabley Creek site, within the Humber Estuary floodplain (Figure 1). The Oxmardyke Marr site was historically fenland and many relict plant species remain. It is now an Environment Agency 'washland' site and features an area of shallow and deeper excavated ponds with mixed vegetation, including a c.2ha stand of predominantly Common Reed *Phragmites australis*. Although both reed bed sites have Common Reed as the predominant plant species, they differ in vegetation community types.

Figure 1. Aerial photograph, with north to the top, of reed bed study sites, Crabley Creek and Oxmardyke Marr.

Bird Ringing Method

At each site, three lines of mist-nets were erected in rides within the reed beds on as near a north-south axis as local topography allowed. Each line of mist-nets consisted of three 40-foot (12m) five-shelf Ecotone nets, totalling 120ft of nets per ride, i.e. 360ft (110m) of standard comparative net per site. Birds were caught between the end of April and the end of August, which adequately covers the breeding season of all target species and the post-breeding dispersion. A total of seven visits was made to both sites and the timing of visits to each was kept as close as reasonably possible, for comparative purposes, allowing for changing weather

conditions. Although practice varied very slightly, the target was to open all nets between 05.00hrs and 05.45hrs. Nets were closed by 11.00hrs unless catching had dropped off to the point where it was considered more effort would not be worthwhile. Nets were visited about every 30 minutes and captured birds were ringed, sexed and aged whenever possible. Standard British Trust for Ornithology (BTO) biometrics were taken for every bird whatever the species. At both sites Reed Warblers and Sedge Warblers were sexed, either when initially captured or when subsequently retrapped, on the basis of brood patch (BP) or cloacal protuberance (CP) (Svensson, 1992, Redfern & Clark, 2001).

Results

(a) Captures

The total number of birds processed, including birds newly ringed, controlled (ringed elsewhere) and re-trapped (caught again at the site of ringing) was 211 at Crabley Creek and 125 at Oxmardyke Marr.

Reed Warbler was the most abundant breeding bird at both Crabley Creek and Oxmardyke Marr, with respectively 29 and 26 adults ringed. Both reed bed sites also held a breeding population of Sedge Warbler, although this species was found in lower numbers (Table 1) with 13 adults ringed at Oxmardyke Marr and 12 at Crabley Creek. Reed Bunting was also breeding at both sites and a total of 14 adults was ringed at Crabley Creek but only nine at Oxmardyke Marr (Table 1). Bearded Tit was absent from the inland reed bed site at Oxmardyke Marr, but it was common at Crabley Creek, with a total of 20 adults ringed between the first visit in May and the last visit in August.

Reed Warbler, Sedge Warbler and Reed Bunting accounted for over 95% of the captures at Oxmardyke Marr. The same three species plus the Beaded Tit made up over 95% of the captures at Crabley Creek. The male-to-female ratio was close to 1:1 for Sedge Warbler, Reed Bunting and Bearded Tit, with the numbers of males and females caught almost identical at both sites; at Crabley Creek there was a similar sex ratio in the Reed Warbler catch but at Oxmardyke Marr it was close to two males per female (Table 1). The remaining captures at both sites (non-target species) are shown in Table 2. This table indicates a similar diversity of species in both reed bed sites. With the exception of Blue Tit and Wren at Oxmardyke Marr, the remaining species were trapped between 8 and 22 August at the two sites (Table 2).

Table 1. The number of individual birds of each of the target species caught, giving the breakdown into known sex (adjusted), unknown sex and juveniles. Adjustments have been made for birds that were of unknown sex when first captured but were subsequently sexed when re-trapped.

	Crabley Creek				Oxmardyke Marr			
	Adults			Juveniles	Adults			Juveniles
Species	Male	Female	Unknown	Unknown	Male	Female	Unknown	Unknown
Reed Warbler	14	12	3	35	17	8	1	24
Sedge Warbler	3	2	7	19	4	4	5	24
Bearded Tit	9	11	0	25	0	0	0	0
Reed Bunting	7	7	0	18	5	4	0	16

Table 2. Non-target species: number of individual birds caught at each site.

Crabley Creek		Oxmardyke Marr	
Species	**No. of birds**	**Species**	**No. of birds**
Meadow Pipit	1	Wren	3
Yellow Wagtail	3	Grasshopper Warbler	1
Wren	1	Whitethroat	1
Whitethroat	1	Chiffchaff	1
Willow Warbler	2	Blue tit	1

(b) Temporal Variation of Captures (Adults and Juveniles)
The numbers of adult Reed Warbler ringed at Oxmardyke and Crabley Creek followed a similar trend, with a peak in late June followed by a decline in the numbers of birds ringed into July and August. There appeared to be a low number of adult birds migrating through the site in July and August, given the low numbers of adults ringed during this period (less than five birds). However, it is unclear whether or not the peak in late June reflected an influx of birds or the dispersive behaviour of adult Reed Warbler at this time of the year, the adults presumably having to extend their foraging territories to feed the dependent young. Numbers of captures of Sedge Warbler were low at both sites. By late July, no adults were ringed and the adults appeared to have departed from the reed bed sites. Nevertheless, juvenile birds continued to be ringed until late August.

In contrast to Reed Warbler and Sedge Warbler, which undertake long migratory movements to Africa, Reed Bunting and Bearded Tit are fairly sedentary on the Humber estuary. Although both species can disperse in autumn, they winter within their breeding range (Wernham *et al.*, 2002). Bearded Tit shows a steady declining trend in the number of adults ringed over the breeding season, probably reflecting the more sedentary nature of this species (Fig.2). The numbers of juveniles ringed peaked in mid-June and this was followed by a second peak (albeit of lower magnitude) in early August. The trends in numbers of Reed Bunting ringed at Crabley Creek differed from that of Oxmardyke for both adult and juvenile birds.

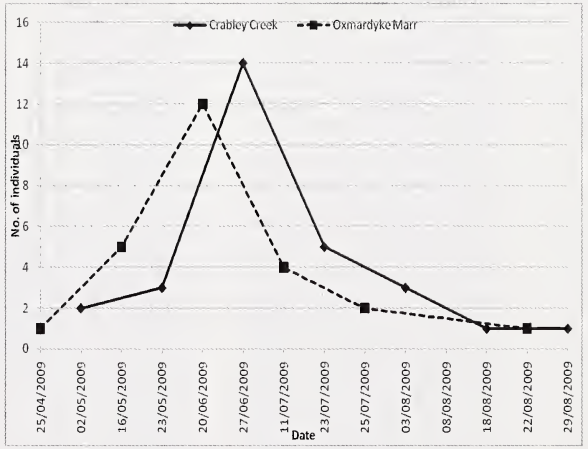
(c) Birds Controlled (Ringed Elsewhere)
The first year of monitoring produced some interesting controls, i.e. birds previously ringed at other sites. A Reed Warbler captured at Oxmardyke on 11 July 2009 (aged and sexed as an adult male,with cloacal protuberance) was originally ringed at the Blacktoft Sands RSPB Reserve as a 3J (juvenile of the year of ringing) on 26 August 2006. Given that it was ringed in late August at Blacktoft Sands, when Reed Warblers may already be on migration, we cannot absolutely be certain that it was a bird born at Blacktoft. The last visit on 29 August at Crabley Creek saw the capture of a Willow Warbler which had been ringed as a juvenile four days earlier at Allerthorpe Common in the Vale of York.

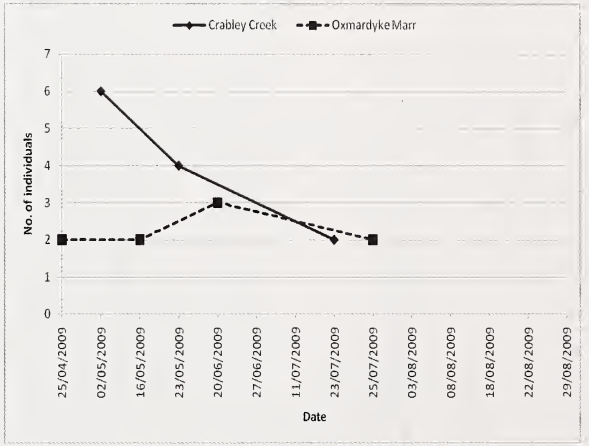
Figure 2. Number of adults and juveniles ringed or controlled per visit at Crabley Creek and Oxmardyke Marr.

Reed Warbler

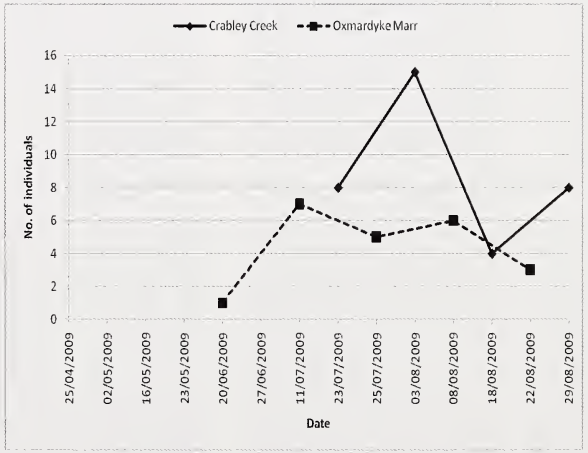
Sedge warbler

Number of adults ringed or controlled





Numbers of juveniles ringed or controlled



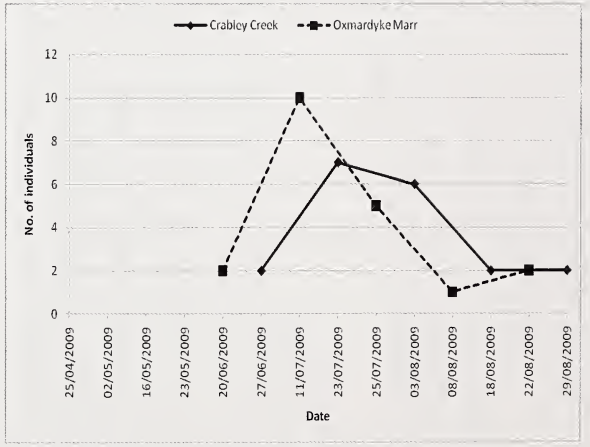
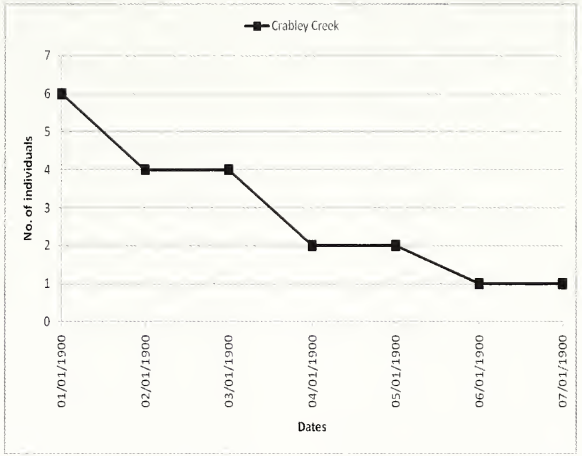


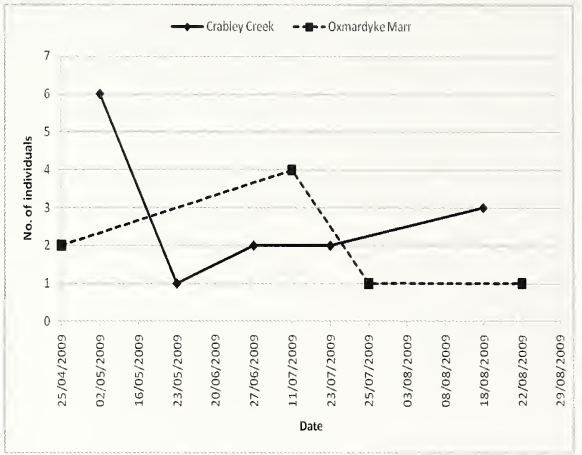
Fig. 2 cont.

Bearded tit

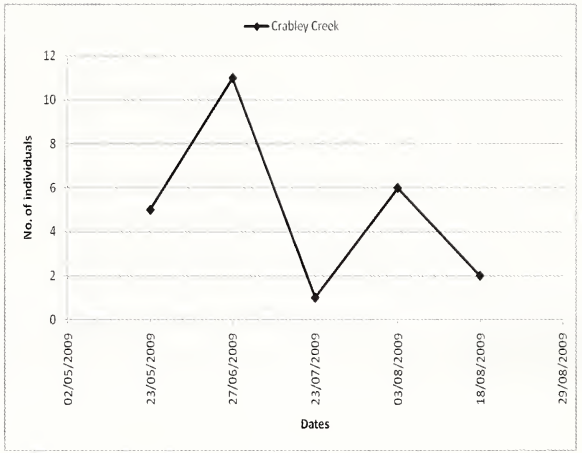
Reed bunting

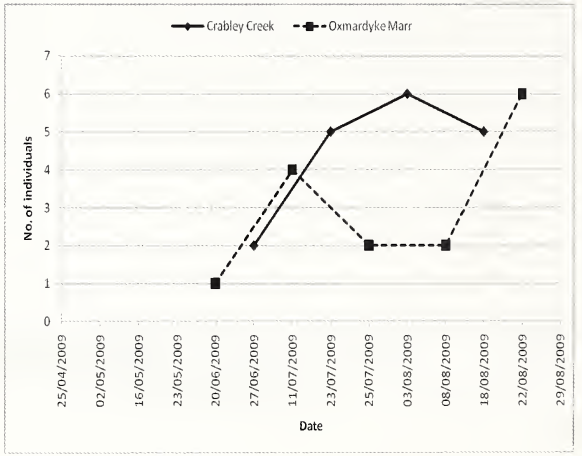
Number of adults ringed or controlled





Numbers of juveniles ringed or controlled





Discussion

The Crabley Creek reed bed site featured an avifaunal assemblage dominated by Bearded Tit, Sedge Warbler, Reed Warbler and Reed Bunting. The data show a lack of migrating movement through the estuary with a rapidly declining trend in captures of new adults from July onwards. This is quite expected for Reed Warbler, as the Humber is located at the northern part of the species' breeding range and therefore little passage is expected through the estuary. Sedge Warbler breeds further north and the lack of migrating movement through the estuary is more surprising. It is interesting that both Sedge Warbler and Reed Warbler followed the same trend at Oxmardyke and Crabley Creek. The high ratio of male to female Reed Warblers caught at Oxmardyke Marr (1.9 to 1) is striking. Even if all the unknown-sex birds were female, which is unlikely, it would still be male-biased, with 1.27 males per female. This could be because our original sexing was incorrect but the more balanced ratio at Crabley Creek suggests that this was not the case. It could also be that there is a male sex bias in the Reed Warbler population at Oxmardyke Marr (but not at Crabley Creek). Alternatively, or in addition, males could be generally more active or foraging over a wider area including other adjacent territories. It will be interesting to see if this difference between the two sites is repeated in subsequent years.

For Bearded Tit, the steady declining trend in adults captured over the breeding season would suggest that most pairs within the Crabley Creek site were caught. The last two visits in August only produced two new adult birds. However, it is an almost continual linear reed bed with breaks at either end of the ringing site of no more than 25m on either side. Are pairs in the adjoining reed bed foraging into this site? Are the juveniles very mobile and do they soon move out of their immediate natal area? It is reasonable to assume that this would be a poor breeding result, given that this species generally has two broods per season (Campbell & Ferguson-Lees, 1972), but information is lacking. Peter Short (pers. comm.) said that in 2002 he only found two or three pairs in the area of the ringing site. Obviously birds will be mobile, but he would not be surprised if we were catching some adults which are flying out of the linear reed bed, most probably west of the Creek, to feed, and that their young may stay in the main block as food levels often rise late in the season.

The Future

There are a number of things we need to take into account and take action on during the coming years. Although we have achieved a minimum habitat survey at the Oxmardyke Marr site it was by no means as comprehensive as we would like to achieve. Although the Crabley Creek site is almost exclusively Common Reed we have made no attempt to survey the habitat in order to verify this statement. We are waiting for some guidance from BTO with regard to the best and most effective way of completing habitat surveys at both sites. As a continuation of the habitat survey, we are also hoping to survey the food source by using fly traps to measure the abundance of Plum Reed Aphid *Hyalopterus pruni*, which is the main food source in reed beds and may be a good indicator of the reed bed quality. This is something we wish to do in conjunction with BTO. One of the key outcomes of this project, over the long term, must also be to assess the survival rates of the key species. In the view of Rob Robinson (BTO) at least five years' data are required before any reasonable assessment can be made. We need to make sure we are producing correct and sufficient data in the intervening years.

Acknowledgements
We are grateful to Associated British Ports and the Environment Agency and their respective tenant farmers, Mr Rob Nicholls and Mr Robert Patchett, for allowing access to their land. We are also grateful to Natural England for the SSSI Permission Notice for our activities at Crabley Creek. We have been supported in our ringing activities by Hugh Brazier, Ian Nicholson and Ray Eades. Pete Short (RSPB Humber Sites Manager) kindly discussed and made some personal comments on the Bearded Tit data. Hugh Brazier was kind enough to read and make helpful suggestions and amendments to an earlier draft of this manuscript.

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Letter to the Editors:

The new look *Naturalist*

I would like to congratulate the editorial team for their achievements with the new look Naturalist journal. This new format continues the wonderful tradition of disseminating contemporary knowledge of our region's flora and fauna in a single high quality natural history journal. In its 150th year the Yorkshire Naturalists' Union can be proud of this accessible and comprehensive publication. I am certain it will be looked upon fondly by peer natural history groups and will encourage an even wider readership than is currently enjoyed by this benchmark publication.

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Yorkshire's threatened plants: Northern Hawk's-beard *Crepis mollis**

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Introduction
In Britain Northern Hawk's-beard *Crepis mollis* (Jacq.) Asch. (Asteraceae) is a Nationally Scarce tall-herb of submontane pastures and hay-meadows on shallow, slightly flushed, base-rich soils in the uplands of Northern England, the Scottish Borders, and the Eastern and Central Highlands of Scotland (Plate I, Centre pages; Braithwaite, 1994; O'Reilly, 2010a). There is also a single record for Denbighshire, North Wales, where it has not been since 1913 (Dines, 2008). Consequently, Yorkshire populations are now the most southerly in the British Isles, extending from Ribblesdale in the south (VC 64) to the River Tees on the northern edge of North-west Yorkshire (VC65) (Abbott, 2005). Old records for North-east Yorkshire (VC62) and South Yorkshire (VC63; Ecclesall Wood) are now thought to be errors or introductions (Cheetham & Sledge, 1941).

Few British botanists will be familiar with *Crepis mollis* and consequently its distribution, habitats and ecology are not well understood. Recent surveys have shown that most British populations occur in meadows, pastures and roadside verges rather than riverbanks and humid gorges, as stated in earlier floras (e.g. Clapham *et al., 1*962). These mirror its habitats in Europe, which include submontane and montane grasslands of the Triseto-Polygonion (e.g. Filipová & Krahulec, 2006; Kohler *et al.*, 2004; Wagner *et al.*, 2007) to which the majority of its British habitats belong (Rodwell *et al.*, 2007). In Europe it also occurs in wet and floodplain hay-meadows in the lowlands (e.g. Havlová, 2006; Kull *et al.*, 2002; Simonavičiūė & Ulevičius, 2007; Wotavová *et al.*, 2004).

In Britain most *C. mollis* populations are submontane (150-400m) but it ascends to 725m on base-rich crags in Caenlochan, Scotland, and to 1500m in montane meadows in the Krkonoše Mountains in the Czech Republic (Filipová & Krahulec, 2006). It is a member of the European Temperate element occurring throughout Central and Southeast Europe, from the Pyrenees and Northern Italy northwards to the Baltic States and from Britain eastwards to Ukraine and western Russia. Three subspecies are currently recognised on the continent (ICN, 2010): subsp. *mollis* appears to be the widespread taxon whereas subsp. *succisifolia* and subsp. *velenovskyi* appear to be restricted to Eastern Europe and the Czech Republic respectively. The identity of British plants has yet to be investigated.

The map for *C. mollis* in the *New Atlas* (Plate I, Centre pages) showed a dramatic decline in the number of hectads recorded since 1970 (Preston *et al.*, 2002). Therefore it was categorised as 'endangered' in the British *Red Data List* (Cheffings & Farrel, 2005), based on an inferred decline of greater than 50% (Criterion A2c), and listed as a 'priority' species in the UK Biodiversity Action Plan in 2007. However, the reasons for this apparent decline are unclear. Although there have undoubtedly been losses due to agricultural improvement, overlooked colonies continue to be found, particularly in its core areas in Durham and Northumberland. A possible explanation is the ease with which it can be confused with other yellow-flowered composites in species-rich swards. These include *Crepis paludosus*, *Leontodon autumnalis*, *L. hispidus*, *Hypochaeris radicata* and microspecies of *Hieracium*, especially *H. prenanthoides* and several species from Section *Foliosa* (O'Reilly, 2010a). When

it is not in flower the basal leaves are also difficult to differentiate from *Centaurea nigra* and *Succisa pratensis*. In fruit a useful character is the clean white pappus which can stand out from those of *C. paludosus* and *Hieracium* species, all of which are dirty white to pale brown, although on many sites inflorescences are removed by grazing animals well before fruiting takes place (M. Braithwaite, pers. comm.)

To gain a better understanding of the status of *Crepis mollis* in Britain, the Botanical Society of the British Isles (BSBI) undertook a national survey of populations in 2008. This project included a survey of a random selection of historic sites to record information on distribution, population size and extent, habitat, management and threats and, for sites where it had disappeared, the probable reasons for loss. In this paper we summarise the history of the plant in Yorkshire and present the results of the survey of Yorkshire populations in 2008. Nomenclature follows Stace (1997) for vascular plants and Watsonian vice-counties and Rodwell (1992) for National Vegetation Classification communities.

Historical records of C*repis mollis* in Yorkshire

Crepis mollis appears to have always been a rare plant in Yorkshire, having only been recorded from 21 sites in 18 1 km squares (Table 1; Fig.1). With the exception of two unconfirmed records, all localities are within vice-counties 64 and 65. The most southerly sites are near to Settle (where it was last recorded in 1875) although the precise localities are unclear as the place-names "Stainforth Wood" and "Major Spring's Wood" (where it was first recorded for Yorkshire in 1811) do not appear on modern maps. A further record for "Ingleton" is presumably the same as F.A. Lees' (1888) record for "Greta Stream" [River] listed in his Flora under "*C. hieracioides*". Today the only extant population is in Colt Park Wood National Nature Reserve (NNR), near to Ribblehead, where plants are scattered along the edge of a wooded limestone pavement (Plate IIa, Centre pages).

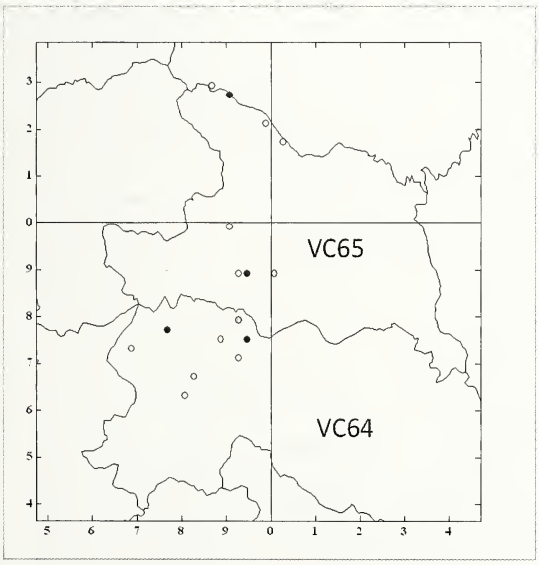

Figure 1. The distribution of *Crepis mollis* in Yorkshire (VCs 64 & 65) at the tetrad scale.
Open circles: recorded before 1970; filled grey circle: recorded 1970-1999; filled black circles: recorded after 2000.

Upper Wharfedale appears to be the headquarters of this species in Yorkshire. Three localities are listed for Littondale and its tributaries but it has not been recorded there since 1956. Records for "Hesletine Beck" presumably refer to Heselden Beck, where it was last recorded "under Pen-y-Ghent Farm" by Augustin Ley in 1902. This locality is thought to be the wooded

gill below Pen-y-Ghent House, which is now too heavily grazed for *C. mollis*, although it could still survive on inaccessible rock outcrops where hawkweeds are still abundant (B. Burrows, pers. comm.). It was also recorded by Lees near to Arncliffe in "bushy places by [the] stream below [the] village" but, again, the exact locality is unclear. Today the most likely localities are the wooded limestone pavements on the valley sides (e.g. Scoska Wood), as most of the valley-bottom grasslands have been improved. The Wharfe above Kettlewell is the current stronghold for *C. mollis* in Yorkshire. Here it grows in limestone grassland on steep, northeast-facing wooded hillsides extending from Starbotton to Buckden, where it was first discovered by J. Cryer (1909) in 1908 (Centre pages, Plate IIb). There is also an intriguing record for Cray Gill at the head of the valley, made during a Wildflower Society meeting in 1986 (T. Fowler, pers. comm.). Although there is much suitable habitat surrounding the gill, *C. mollis* has not been refound despite repeated searches.

In Wensleydale *C. mollis* has been recorded in three separate localities, although only one appears to be extant. This is located on an unimproved, species-rich bank in a semi-improved pasture near to Worton (Fig. 3c). This site was discovered by Ian Lawrence on a YNU field meeting in 1978 and described incorrectly as "Field below Wooton [*sic*] Scar. 34/98" (Anon., 1981) and "Attleborough" in the Biological Records Centre Database. In 2008 it was re-discovered after a search of suitable fields below the scar. The second site, "Bain Gill Top", is probably the gorge to the north of Semer Water but very little suitable habitat survives today due to agricultural improvement and over-grazing. The precise location of the "Carperby" record, made in 1906, is unknown.

The only record for Swaledale is "Kisden", probably Kisdon, a small hamlet just above Muker. Although it could have occurred there in the past, no suitable habitat survives today. An F.A. Lees (1888) record for "Gunnerside" could refer to the same site as Kisdon Side is situated on the slopes facing Gunnerside opposite Crackpot Hall.

In Teesdale *C. mollis* still occurs on both sides of the River Tees. It appears to be more common on the Yorkshire (south) side, having been recorded from at least six localities close to the river, although only two were found in 2008. These include two small banks in meadows and pastures near to Holwick, one of which has an exceptionally rich flora including *Alchemilla subcrenata*, *Gentianella campestris* and *Pseudorchis albida* (Plate IId, Centre pages). The precise localities of the remaining four sites are unknown. There are numerous herbarium specimens of *C. mollis* for VC65 labelled "High Force", the last of which appears to have been collected in 1925, **BIRM**[1]. T.J. Foggitt knew it there and showed it to Eleanor Vachell on 8 July 1920 (Forty & Rich, 2005), although it is not clear whether they visited the south (VC65) side of the river. Populations further down the Tees were also known to William Foggitt of Thirsk who recorded it as "plentiful" from Winch Bridge to Holwick [where it still occurs] and down to Middleton, and also in Deepdale and between Ronaldskirk and Hunderthwaite nearer to Barnard Castle in 1903. There is also an intriguing Lees record in 1874 from a "Rocky field bank near Fairy Knowle on S. of Tees just where basalt crosses valley from Lunesdale to Egglesburn, alt. 1800 feet [must be 800 ft which is 244 m]". This is a very precise description but as yet we have been unable to discover the exact location. Lees later added that "in fields, "drift" covered, close to Barnard Castle, it is clearly adventive if not out of its element" suggesting that he considered meadow plants to be recent colonists from higher up the dale (Dallman, 1939). Lees also gives a record for a "meadow" near to Ecclesall Wood, Sheffield, VC63 (T. Gibbs, 1895) where again he considered it to have been introduced (Cheetham & Sledge, 1941).

[1]Editor's note: BIRM refers to the Birmingham Herbarium

***Crepis mollis* in Yorkshire in 2008**

In 2008 the authors visited sites where locality details allowed us to pinpoint them with some accuracy (Table 1).

Table 1.
Records of *Crepis mollis* in Yorkshire (VCs 64 & 65) with the year of last record.
Codes for 'Status' are as follows: P, searched in 2008 and refound; X, searched in 2008 but not found; NV, not visited in 2008; ?, status uncertain.

Locality	1-km	Last record	Status	Recorder	Comment
MID-WEST YORKSHIRE (VC64)					
Ingleton	SD6973	1958	NV	Anon.	An F.A. Lees "Greta Stream" record is probably this site
Colt Park Wood, Ribblesdale	SD7777	2008	P	KJW	Wooded limestone pavement
Major Springs Wood, Settle	SD8163	1811	NV	Windsor	Precise locality unknown (not marked on modern maps)
Stainforth Scar, Settle	SD8266	1875	NV	Tatham	Precise locality unknown (not marked on modern maps)
Littondale	SD8-7-	1956	?	Roche	Precise locality unknown. Includes Arncliffe & Hesleden
Under Pen-y-Ghent Farm, Littondale	SD8874	1902	X	Ley	Borrer's record for "Hesletine" probably refers to this site
Arncliffe, Littondale	SD9371	1888	NV	Lees	"Bushy places by stream below village"
Bounty, near Starbotton	SD9574	2008	P	KJW	Steep calcareous pasture on valley side
Firth Wood, N of, Buckden	SD9474	2008	P	KJW	Steep calcareous pasture on valley side
Firth Wood, below, Buckden	SD9475	2008	P	KJW	A 1908 J. Cryer "Buckden" record is probably this site
Cray Gill, Upper Wharfedale	SD9378	1986	X	Fowler	Suitable habitat remains; possibly overlooked
NORTH-WEST YORKSHIRE (VC65)					
Bain Gill, Wensleydale	SD9288	1888	X	Anon.	No suitable habitat found; probably extinct
Worton Scar, Wensleydale	SD9488	2008	P	KJW	Discovered by I. Lawrence in 1976; relocated in 2008
Carperby, Wensleydale	SE0089	1906	NV	Baker	Date of publication. Precise locality unknown
Kisdon, Swaledale	SD9098	1907	X	Foggitt	Precise locality unknown. Foggitt's specimen is in HDD
High Force, Teesdale	NY8628	1925	NV	Heath & Foggitt	Specimen in BIRM. Many earlier records for this site
Egglesburn, Teesdale	NY9027	1874	NV	Lees	The precise locality is unclear
Wynch Bridge, Teesdale	NY9027	2008	P	KJW & LR	New site; species-rich bank adjacent to the River Tees
Holwick, Teesdale	NY9027	2008	P	KJW & LR	Re-find; in wet pasture next to R. Tees
Hunderthwaite-Ronaldkirk, Teesdale	NY9821	1903	NV	Foggitt	Precise locality unknown
Deepdale	NZ0216	1903	NV	Foggitt	Precise locality unknown

C. mollis was found at three well-known sites (Colt Park, Bounty and Firth Wood) and re-discovered at two others where it had not been seen for many years (Worton Crag and Wynch Bridge). In addition, two new populations were discovered near to Starbotton and Holwick, giving a total of seven extant sites. No plants were found at Kisdon, Bain Gill, Cray Gill or Hesleden Beck. However, plants could still occur at all these sites and further searches are planned in the future.

Population size and extent

With the exception of Bounty, populations hold less then 50 plants (Table 2). Plants in the two largest colonies, at Bounty and Firth Wood, were scattered at low density across three hectares of limestone grassland on a steep ENE-facing slope. All other populations were much more restricted in extent: at Worton around 50 plants occur over about a 50 × 40 m area on a species-rich bank whereas at Holwick and Wynch Bridge populations extend over just a few square metres. The population at Colt Park may be much more extensive as scattered plants have been found in the past but always at very low density (J. Roberts, pers. comm.).

Habitats and vegetation

Yorkshire populations occur between 210-270m altitude and, with the exception of Colt Park, all occur on relatively steep, sheep-grazed slopes with a northerly aspect (Table 2). Extant populations occur in three distinct habitats; wooded limestone pavement, steep limestone pasture on valley sides and grazed species-rich banks within otherwise improved pastures or hay-meadows (Table 2; Plate II).

Table 2. Details of *Crepis mollis* sites in Yorkshire surveyed in 2008. National Vegetation Classification communities (Rodwell, 1992) were assigned using Tablefit (Hill, 1996).

Site name	Number	Area (ha)	Slope (°)	Aspect	Alt. (m)	Habitat type/management	NVC type	Conserv -ation
Colt Park Wood	6	<0.1	5	N	340	Wooded limestone pavement	MG2	NNR
Bounty	c.200	1.1	40	ENE	240	Grazed pasture on steep valley side	MG3b	SSSI
Firth Wood, below	48	2.8	35	NE	245	Grazed pasture on steep valley side	U4c	SSSI
Firth Wood, near	1	<0.1	35	ENE	250	Grazed pasture on steep valley side	Not recorded	SSSI
Worton Scar	44	0.1	25	NNE	210	Grazed bank in pasture	MG2a/ CG2c	None
Wynch Bridge	25	<0.1	15	NE	270	Grazed bank in pasture	MG5c	None
Holwick	7	<0.1	30	NW	260	Grazed bank in hay-meadow	MG5c	None

At Colt Park plants were partially shaded and rooted in shallow soils that had accumulated on the tops of limestone clints. This supports luxuriant *Arrhenatherum-Filipendula* tall-herb grassland (MG2) under a canopy of *Fraxinus excelsior* with abundant *Mercurialis perennis*, *Festuca rubra* and *Heracleum sphondylium* (Table 3). *Crepis mollis* occurs in similar vegetation partially shaded by trees at Worton in Wensleydale (MG2a). All other Yorkshire populations grow in open grassland. The Wharfedale populations occur on uniformly steep

(30-40°) ENE-facing slopes. The majority of plants at Bounty occur on colluvial soils that have accumulated over limestone scree and support *Anthoxanthum odoratum-Geranium sylvaticum* northern hay-meadow grassland (*Briza media* sub-community; MG3b), presumably due to flushing of base-rich water down the slope. Here the vegetation is very species-rich (33 species per quadrat) with abundant *Anthoxanthum odoratum*, *Dactylis glomerata*, *Galium verum*, *Potentilla erecta* and the tall-herbs *Centaurea nigra*, *Filipendula ulmaria* and *Geum rivale*. The grassland below Firth Wood is similar but with more *Cirsium heterophyllum*, *Deschampsia cespitosa*, *Geranium sylvaticum*, *Lotus corniculatus* and *Succisa pratensis*. This grassland most closely resembled *Lathyrus linifolius-Stachys officinalis* sub-community of *Festuca ovina-Agrostis capillaris-Galium saxatile* grassland (U4c), which typically occurs on deeper soils on slopes flushed by base-rich water. The vegetation at Worton in Wensleydale was similar but with a greater calcareous element, presumably because of the greater influence of the underlying limestone. As a consequence, the calcicoles *Helianthemum nummularium*, *Leontodon hispidus*, *Pimpinella saxifraga* and *Sanguisorba minor* were all abundant and the community closely resembled *Holcus lanatus-Trifolium repens* sub-community of *Festuca ovina-Helictotrichon pratensis* grassland (CG2c).

Weighted mean Ellenberg values were calculated for each site to provide an overall summary of Yorkshire habitats. Each species was weighted by its DAFOR value after conversion to a numeric score (1: rare to 5: dominant). Across the sites light (L) varied from 6-7.2 with an average of 6.8 (± 0.2), indicating that this is a plant of well-lit places but able to tolerate some shade. Moisture (F) ranged from 5.1 to 5.7 with an average of 5.4 (± 0.1), indicating a plant of 'moist' soils, while reaction (R) ranged from 5.2 to 6.5 with an average of 5.8 (± 0.2), indicating relatively neutral to slightly acid soils, presumably reflecting the high precipitation and leaching at all the sites. Nitrogen (N) ranged from 3.2-5.3 with an average 4.0 (± 0.3), indicating a plant of soils of intermediate fertility. Interestingly, with the exception of F, the mean weighted Ellenberg values were a single unit lower than those given by Hill *et al.* (2004) suggesting that, in Yorkshire at least, *Crepis mollis* inhabits slightly more closed, less fertile and more acidic habitats than has previously been thought to be the case.

Both sites in Teesdale were associated with intrusions of basalt and were assigned to the *Danthonia decumbens* sub-community of *Cynosurus cristatus-Centaurea nigra* grassland (MG5c) with abundant *Agrostis capillaris*, *C. nigra*, *C. cristatus*, *Holcus lanatus*, *Plantago lanceolata* and *Succisa pratensis*. The grassland at both sites was very rich, supporting a number of national rarities including *Alchemilla glomerulans*, *A. subcrenata*, *A. wichurae*, *Gentianella campestris*, *Persicaria vivipara*, *Pseudorchis albida* and *Trollius europaeus*.

Table 3. Associates of *Crepis mollis* at six sites in Yorkshire (recorded in eight 1m radius circular quadrats). Only species recorded in four or more quadrats are shown (additional species are listed below). Mean abundance was calculated by converting 'DAFOR' scores to a numeric scale i.e. Dominant = 5, Abundant = 4, Frequent = 3, Occasional = 2, Rare = 1.

Species	Frequency	Abundance	Species	Frequency	Abundance
Crepis mollis	8	1.5	*Conopodium majus*	5	1.8
Centaurea nigra	7	2.6	*Festuca rubra*	5	1.8
Succisa pratensis	6	3.0	*Ranunculus acris*	5	1.6
Potentilla erecta	6	2.3	*Veronica chamaedrys*	5	1.6
Plantago lanceolata	6	2.2	*Prunella vulgaris*	5	1.4
Campanula rotundifolia	6	1.5	*Dactylis glomerata*	4	2.8
Anthoxanthum odoratum	5	2.8	*Agrostis capillaris*	4	2.3
Festuca ovina	5	2.6	*Briza media*	4	2.3
Filipendula ulmaria	5	2.2	*Geum rivale*	4	2.0
Cynosurus cristatus	5	2.0	*Lotus corniculatus*	4	2.0
Holcus lanatus	5	2.0	*Potentilla sterilis*	4	1.8
Cerastium fontanum	5	1.8	*Trifolium repens*	4	1.5

Additional species. 3 quadrats: *Arrhenatherum elatius, Carex panicea, Carex pilulifera, Cruciata laevipes, Deschampsia cespitosa, Galium verum, Helictotrichon pratense, Helictotrichon pubescens, Leontodon hispidus, Luzula campestris, Primula veris, Ranunculus repens, Sanguisorba minor, Viola riviniana.*

2 quadrats: *Ajuga reptans, Carex flacca, Crataegus monogyna (*seedling*), Euphrasia agg., Festuca pratensis, Geranium sylvaticum, Lathyrus pratensis, Linum catharticum, Mercurialis perennis, Pilosella officinarum, Rhinanthus minor* subsp. *monticola, Rumex acetosa, Senecio jacobaea, Trisetum flavescens.*

1 quadrat: *Achillea millefolium, Alchemilla glabra, Allium ursinum, Asplenium viride, Brachypodium sylvaticum, Carex caryophyllea, Carex pallescens, Carex pulicaris, Cirsium heterophyllum, Dactylorhiza fuchsii, Epilobium montanum, Festuca arundinacea, Festuca vivipara, Fraxinus excelsior (*seedling*), Galium aparine, Galium odoratum, Galium sterneri, Gentianella campestris, Geranium robertianum, Geum urbanum, Gymnadenia conopsea subsp. borealis, Helianthemum nummularium, Heracleum sphondylium, Hieracium agg., Hyacinthoides non-scripta, Hypochaeris radicata, Juncus acutiflorus, Koeleria macrantha, Lapsana communis, Lathyrus linifolius* subsp. *montana, Leontodon autumnalis, Lysimachia nemorum, Oxalis acetosella, Persicaria vivipara, Phleum bertolonii, Phyllitis scolopendrium, Pimpinella saxifraga, Poa trivialis, Prunus spinosa (*seedling*), Ranunculus bulbosus, Rubus caesius, Rubus idaeus, Sanguisorba officinalis, Scabiosa columbaria, Serratula tinctoria, Silene dioica, Stachys officinalis, Stellaria graminea, Stellaria media, Taraxacum officinale, Trifolium medium, Trifolium pratense, Trollius europaeus, Vicia sepium.*

Management

With the exception of Colt Park and Holwick, Yorkshire populations were all grazed at low intensity by sheep and rabbits at the time of the survey. As with many Dales pastures, these are grazed for part of the year, usually with the livestock being removed for short periods to allow flowering to take place. This would certainly be the case in Wharfedale and Wensleydale where sites are managed sympathetically either as SSSIs or by tenants of the National Trust.

In comparison, the Holwick population occurs within a hay-meadow that had been 'shut-up' for hay for at least two months prior to our July survey and is currently being managed sympathetically for its rich meadow flora, despite receiving no formal protection or support through agri-environment schemes. The Wynch Bridge site appeared the most 'improved' pasture but still retained an interesting flora. However, it is unlikely that any of the slopes on which *C. mollis* occurs on these sites are cut for hay. In comparison the Colt Park population occurs on an ungrazed, wooded limestone pavement.

Threats

The results presented in Table 2 suggest a dramatic (67%) decline from 21 to seven populations. However, we were only able to confirm, with some confidence, its absence at three of the 14 sites for which there are no recent records. Many older records were too imprecise to resurvey and could therefore have been easily overlooked and await rediscovery. Furthermore, many records could actually relate to the same site while new overlooked populations may remain to be found. These figures therefore undoubtedly overestimate the scale of decline.

However, the species has certainly been lost from at least three sites and their condition in 2008 suggests that over-grazing and/or conversion from hay to silage production are probably the main causes. Indeed, the restriction of the majority of surviving populations to steep banks or valley sides has probably afforded protection from reseeding and improvement. Changes in grazing regimes could also threaten populations, although fortunately most known sites are managed sympathetically as conservation areas.

Conclusions

Crepis mollis has probably never been a common plant in Yorkshire and now only survives in a handful of sites that have escaped agricultural improvements and increases in stocking levels. Typical habitats include steep slopes or banks in upland hay-meadows or pastures that are not practical to mow, fertilise or reseed. Although it is clearly one of Yorkshire's most threatened plants we are cautiously optimistic about its future, given that the majority of populations are on nature reserves (SSSIs, NNRs) or in grassland managed under agri-environment schemes. We also expect additional populations to be discovered in the future as recorders become more familiar with its habitats as a result of targeted surveys such as these. However, the isolation and small size of Yorkshire populations is likely to make it highly vulnerable to changes in management as well as climate change and increased eutrophication from atmospheric sources. Indeed, recent surveys in the Yorkshire Dales and North Pennines have revealed a decline in the overall richness and quality of meadows over the last few decades (Pacha & Petit, 2008; O'Reilly, 2010b) as well as a decline in the abundance of characteristic hay-meadow species e.g. *Alchemilla* spp., *Cirsium heterophyllum* and *Geranium sylvaticum*; (Bradshaw, 2008; Pacha & Petit, 2008). Although some of these losses have been linked directly to habitat loss as a result of agricultural improvement, shifts may also be occurring on high quality sites due to subtle changes in management, even on land managed for conservation (O'Reilly, 2010b). In North Pennine hay-meadows these have included increases in weedy species, annual herbs and damp-loving species (O'Reilly, 2010c) possibly in response to changes in management. This includes the cessation of liming, introduction of new livestock breeds, less variability in the timing and intensity of cutting and grazing and changes in the content, timing and application of farm-yard manure. In addition, major environmental changes such as milder, wetter winters combined with increased eutrophication may also be affecting the composition of upland grasslands, in particular populations of poor competitors such as *C. mollis,* due to a general increase in the productivity of upland swards.

On a more practical level, land managers were often unaware of the presence of *C. mollis* on their sites and, consequently, management prescriptions rarely took its needs into account. It is, therefore, no surprise that, with the exception of a few sites, *C. mollis* is now restricted to relatively 'unmanaged' areas that are too steep for agricultural operations such as mowing, fertilizing or reseeding. These habitats now provide vital refuges for many grassland species dependent on traditional management; their protection and continued management is vital not only for threatened plants such as *C. mollis* but also upland grassland species more generally.

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Letter to the Editors:

Pellets: Coughing up the Truth or Flight of Fancy?'

Having read the above article with some interest and not a little bewilderment, I will make just two observations:

It is not strictly true (page 17, para 3) to say without qualification that female birds possess only one ovary. The majority, yes, but some individuals, usually birds of prey, sometimes have, in addition to the normal left ovary, a small right one.

The statement that male birds have only one testis is blatantly, and surprisingly, wrong. From my experience over the past 60 years, having undertaken the internal examination of over 2,600 dead birds of 408 species, I can confirm that they always have two.

Dr John R. Mather

The status of spider recording in Watsonian Yorkshire

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A History of Spider Recording in Yorkshire

The earliest written reference to spiders in Yorkshire was published more than 300 years ago. Lister (1678) made reference to 38 'species' of spider in his treatise. As this was published before the Linnaean system of classification, 'species' names don't follow the familiar binomial system. For example, species number 27 (XXVII) is called "*Araneus flavus unicolor, alvo productiori acuminata*", which my attempt at translation (with the aid of Google Translator[2]) comes to "uniform yellow spider with the abdomen extended and pointed". Without a professional translation, I am unable to correlate the 'species' with the modern accepted taxonomic name. However, Lister did give locations (*Locus*) and for five species there is a reference to *Eboracum* (York). However, there are no dates assigned to any 'species', nor more specific locations, or any indication as to whether Lister collected the specimens himself.

The earliest known spider records attributed with any certainty to an individual are those of the Bradford-based naturalist and surgeon Richard Henry Meade (1814–1899). Meade was a consultant surgeon at Bradford Infirmary, moving to Yorkshire in 1840 (Anon., 1899). McLachlan (1900) reported that he made some observations on spiders and harvestmen in the 1850s, publishing during this decade before a complete cessation of work for 10 years. He is noted as capturing the specimen that became the type species of *Tmeticus affinis* (originally described as *Neriene affinis*), collected at Hornsea Mere in 1854 (Blackwall, 1855). He published an article on the occurrence of spiders and their webs in Pelton Colliery, referring to 23 or 24 specimens of *Neriene errans* (now known as *Porrhomma errans*) that were sent to him by a Mr. Stainton (Meade, 1860). Meade continued to record not only spiders but also harvestmen during the 1850s and 1860s (Meade, 1855; Meade, 1861) and became an expert in Diptera (McLachlan, 1900). The last known record attributed to Meade is a single specimen of *Diaea dorsata*, captured in 1866.

The first collated published list of spiders for Yorkshire was included in the *Victoria County History*. Pickard-Cambridge stated that Meade never, as far as he was aware "...published any list of his numerous Yorkshire captures...". Pickard-Cambridge (1907), in his review of the species known to him in Yorkshire, included 219 species considered to be reliably recorded in the county and a further two species, *Neriene montana* and *Linyphia meadii*[3], which he considered doubtful. He also included *P. errans* in his list, assigning the initials 'RHM' against the record, presumably on the basis of the specimens' association with Meade. However, Pelton Colliery (NZ 253 517) is in County Durham, just outside Chester-le-Street and well within vice-county 66 (Durham). It would therefore seem that the record has been erroneously assigned to Yorkshire on the basis that Meade identified the specimen. These 219 species form a basic taxonomic list with brief comments on distribution that are mostly associated with towns or cities where the recorders lived, the two principal contributors being Meade and William Falconer, who lived in Slaithwaite, near Huddersfield.

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2 http://translate.google.co.uk/?hl=en&tab=wT#la|en|

3 *Linyphia meadii* was originally described by John Blackwall based on male and female specimens collected under a stone at Low Moor, Bradford by Richard Henry Meade in May 1852 (Blackwall 1853). The species was subsequently transferred to the genus *Bathyphantes*. However, it is now considered a *nomen dubium* by Platnick (2010).

The next equally significant event in Yorkshire arachnology occurred in the early 1980s with the publication of Clifford Smith's *An Atlas of Yorkshire Spiders* (Smith, 1982). This was the first attempt nationally, let alone within Yorkshire, to map all known spider records to hectads (10 km squares), a format that was followed some 20 years later with the national Atlas (Harvey *et al.*, 2002). As at the end of 1981, a total of 390 species had been recorded in Watsonian Yorkshire, an increase of 171 species in the 74 years since the *Victoria County History.*

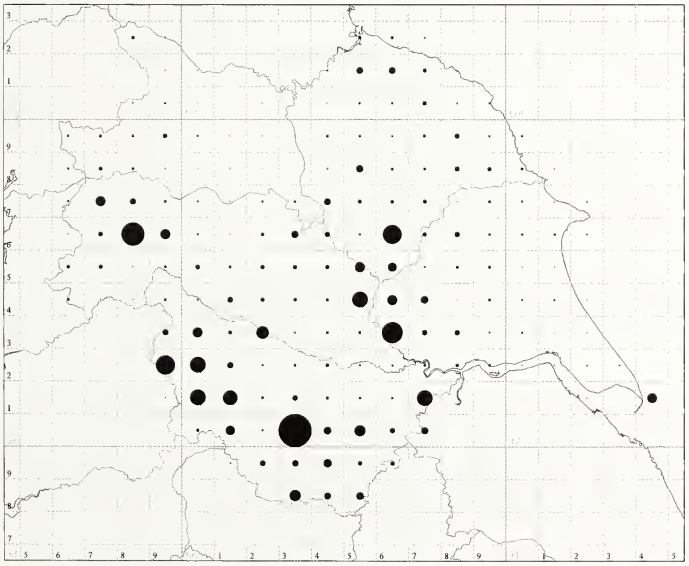
The final milestone occurred during the 20 year period when concerted survey work focussed on collating records for the national Atlas. By the end of 2001, a further 11 species were added to the Watsonian Yorkshire list, bringing the total to 417 species. Thus by the turn of the century, the number of species recorded had probably doubled since Meade was actively recording (150 years previously).

Spider Recording (Post 2002 Atlas)

A further 6196 records, comprising 305 species, have been recorded in Watsonian Yorkshire between the Atlas being published in 2002 and the end of 2010, bringing the known species and their distribution up to date. In terms of the number of hectads visited, coverage of Watsonian Yorkshire has been comprehensive, despite its size. Of the 205 hectads that either entirely or partially fall within Watsonian Yorkshire, 196 have had at least one spider species recorded. Thus 95.6 % coverage has been achieved, which is higher than the national average of 86 %, based on the national atlas. Survey effort to cover all tetrads (2 km squares), whilst desirable, would probably be impractical. Despite *c.* 150 years of recording, no single hectad has yet to receive complete coverage of all its 25 tetrads, though SE 10 comes close (SE 10B and SE 10M being the only two tetrads lacking a record).

However, coverage has not been uniform. An idea of survey effort across Watsonian Yorkshire is illustrated in Figure 1, which plots the number of spider records (*n* = 48,456) in each hectad.

Fig.1 Recording effort in Watsonian Yorkshire



Circle diameter indicates number of records (relative scale).

From this map, it is evident that there are approximately seven distinct sub-regions that have been subject to relatively intense study. These are:

Spurn Point (TA 41);
the Vale of York (SE 63 – SE 66, SE 54 and SE 55);
Thorne & Hatfield Moors (SE 71);
Barnsley and surrounding area (SE 30 – SE 50);
Leeds (SE 23);
Pennines west of Halifax and Huddersfield (SE 10 – SE12, SE 01 –SE 03 and SD 92);
the Malham area in the Yorkshire Dales (SD 86, SD 96, SD 77 and SD 87).

Under-recorded areas are particularly evident throughout VC 65, central VC 64, north-west VC 62 and much of VC 61. The nine hectads that have not received coverage are listed in Table 1 with a settlement/ geographic feature to aid location.

Table 1: Hectads within Watsonian Yorkshire with no spider records

Vice-County	Hectad	Settlement/ Geographic Feature
61	TA 25	A tiny area (< 0.1ha) of terrestrial habitat at the foot of a shallow cliff, approximately 1km south-east of the village of Atwick (near Hornsea). A public footpath runs through this tiny area, so potential for spider records.
	TA 33	Countryside around the village of Tunstall, near Withernsea.
62	NZ 42	Urban and industrial area in north Middlesbrough, south and east of the River Tees.
	NZ 11	Countryside to the south of the River Tees in and around the villages of Hutton Magna (west) and Eppleby (east), south-west of Middlesbrough.
	NZ 12	Countryside to the south of the River Tees in and around the villages of Manfield, Cleasby and Stapleton, south-west of Middlesbrough.
	OV 00	A tiny area (< 0.4ha) of intertidal habitat and a fraction of terrestrial habitat at the base of the cliff, *c.* 2km south-east of Ravenscar. Area appears to be inaccessible by foot from the nearest public footpath so unlikely that any records could be obtained from this precarious location.
63	SE 81	An area of countryside to the north of the B1392 from Eastoft (west) to Luddington (east) and then north-east towards Fockerby.
	SD 90	Mixture of semi-rural and urban environments in the vicinity of Delph, Uppermill and Dobcross, *c.* 5km east of Oldham.
65	SD 55	An isolated, though quite extensive area of upland (Hawthornthwaite Fell), approximately 4km west of the nearest human settlement (Sykes) up an unmetalled track (public footpath).

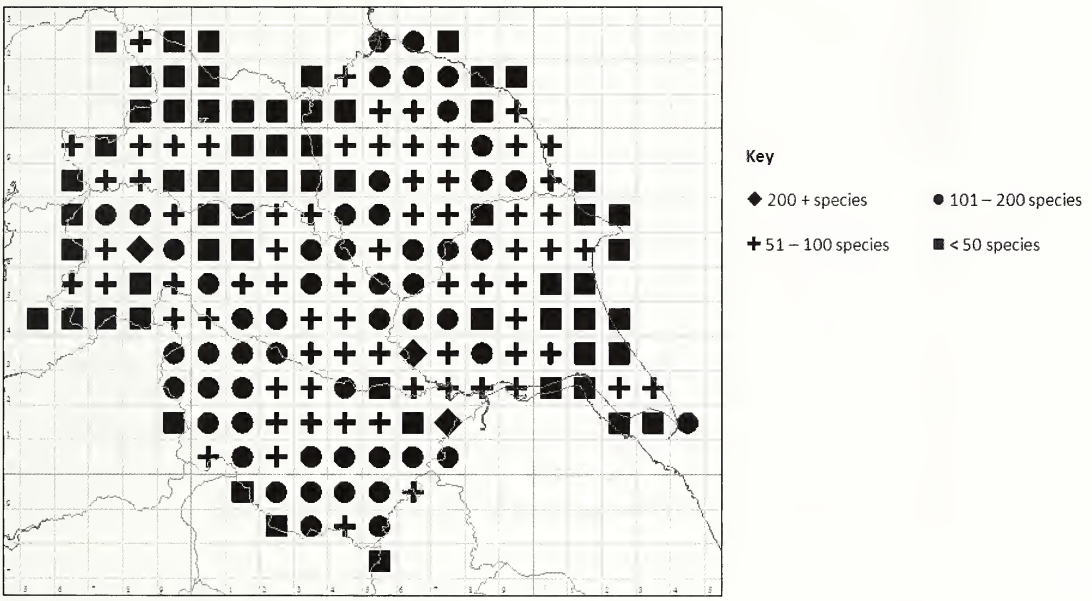
This survey effort is also reflected in the spider diversity for each of the VCs. Since 1850, a total of 428 species has been recorded across all VCs. Table 2 lists the number of species for each VC. The total number of species recorded in Watsonian Yorkshire represents approximately two-thirds of the British list, currently at 645 species (Merrett and Murphy, 2000).

Table 2: Number of Species Recorded in the Watsonian Vice-Counties of Yorkshire

Vice-County	Number of Species (as at 31/12/2010)
61 south-east Yorkshire	327
62 north-east Yorkshire	354
63 south-west Yorkshire	367
64 mid-west Yorkshire	346
65 north-west Yorkshire	214

Fig. 2 illustrates the number of species recorded within each hectad, and usefully shows those hectads (indicated by crosses and squares) that currently support very few species and can be considered to be under-recorded. The dominance of squares (< 50 species) within the northern Yorkshire Dales (VC 65) and Holderness (VC 61) identify the geographic regions that would benefit most from further study. The high proportion of crosses (51 – 100 species) throughout Watsonian Yorkshire demonstrates the general under-recording within the Region.

Figure 2. Spider recording in Watsonian Yorkshire



The number of hectads with more than 100 species recorded (*n* = 56) represents just over one-quarter of all hectads in Watsonian Yorkshire.

'Rare' Species

For the purpose of this report, the SRS database was analysed to see which species had not been recorded in each Watsonian Yorkshire vice-county for at least 50 years, i.e. since 1960. The 50 year threshold was chosen as it seems a reasonably sufficient period, allowing for variations in recording effort over time, for a species to be considered to be rare owing to its scarcity. The 50 year threshold has also previously been adopted by the International Union

for Conservation of Nature as a means of declaring probable extinction (Fisher & Blomberg, 2010). As 'rarity' can be difficult to define precisely, being dependent on a number of variables (e.g. abundance, range size, genetic diversity or endemism) (Gaston, 1997), and as it can also be a function of the scale at which a species is mapped (Kunin *et al.*, 2000), the 50 year threshold adopted for this article seems not unreasonable.

A number of species have not been recorded in the different vice-counties of Yorkshire since 1960. A full list can be found at www.ynu.org.uk/The_Naturalist. Eleven species have not been recorded in the whole of Watsonian Yorkshire since this date, 2.6% of the total species recorded. These are:

Walckenaeria capito, Thyreosthenius biovatus, Panamomops sulcifrons, Lepthyphantes insignis, Argenna subnigra, Scotina celans, Cheiracanthium virescens, Haplodrassus silvestris, Urozelotes rusticus, Philodromus emarginatus, Xysticus kochi

These species can be considered as Watsonian Yorkshire's rarest spiders. Determining whether they remain in the county would be a valuable exercise. Judging from the habitat descriptions given in Harvey *et al.* (2002), it is possible to place most of them in two broad categories:

- infrequently surveyed habitat: *W. capito* (on high ground), *T. biovatus* (in ants' nests) and *L. insignis* (possibly subterreanean/living in soil); and
- edge of range: *P. sulcifrons*, *A. subnigra*, *S. celans*, *C. virescens*, *H. silvestris*, *P. emarginatus* and *X. kochi*.

One species (*U. rusticus*), is considered to be a sporadic species that may not have gained a permanent foothold in the UK. The only Yorkshire record is from Leeds in 1954 and the last national record was from Merseyside in 1994 (Spider Recording Scheme, 2011).

Future Work

With just under 75% of hectads recording less than 100 species, there is clearly considerable opportunity to increase our knowledge of the true distribution of Watsonian Yorkshire's spiders. A focus in under-recorded areas as described in this article will inevitably assist in this objective. Anyone living in, or close to, certain areas within VCs 61, 62 and 65 will be able to contribute disproportionately, as many areas are poorly, or very poorly, recorded. An alternative project could be to set out and re-find those species listed at www.ynu.org.uk/The_Naturalist, especially those 11 species detailed above. It is hoped that this article will provide the encouragement to do so. Surely, there can be no better region in England to survey for spiders than that which contains the Yorkshire Dales, North York Moors, the hidden valleys of the Wolds, the dramatic coastline or some of the great industrial cities of the north!

Submission of Records

As the Area Organiser for the national Spider Recording Scheme (for VCs 61, 62, 64 and 65), managed by the British Arachnological Society (BAS), I would welcome receipt of records of any spiders (and indeed, harvestmen) collected within Yorkshire. With prior arrangement, I would also be happy to receive a limited number of specimens to confirm or provide identification.

Further information on British spiders and harvestmen can be found via the BAS website (www.britishspiders.org.uk). There is also a 'Yorkshire Spider' dedicated page on the Spider Recording Scheme website (http://srs.britishspiders.org.uk/portal.php/p/Yorkshire%20Spiders). Please keep an eye out for developments.

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Note: this article has also been published at http://srs.britishspiders.org.uk/resource/SRSNL69.pdf

The early botanical exploration of the Yorkshire Dales*

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Introduction

The Yorkshire Dales is an upland area of Carboniferous Limestone of outstanding natural beauty. It extends from the town of Skipton in the south to Kirkby Lonsdale in the west, Kirkby Stephen in the north to Richmond in the east. With its varied geology and dramatic scenery it is also well known for its diverse flora. Botanists have visited the area since the sixteenth century.

William Turner (c.1508-1568) has been described as the father of English botany (Chapman, 1984). Born in Morpeth he went on to become both a physician and clergyman. He had nothing but contempt for the herbals of his time which he described as 'full of unlearned cacographies and falsely naming of herbs' (Raven, 1986). His own work (Turner, 1835) contained the first details of plant localities, many of them from Northumberland. He also recorded the 'Ughe tree [Taxus] groweth in diverse parts of Yorkeshyre'.

Later herbals have also been criticised for the misidentification of plants but often include specific localities where particular plants could be found. The purpose of this paper is to list the localities of plants first discovered in the Yorkshire Dales and to speculate on the botanists who explored the area in the sixteenth and seventeenth centuries.

John Gerard

Probably the best known of the early herbals is that of John Gerard. His *The Herball or Generall Historie of Plantes* is a massive volume of nearly fourteen hundred pages adorned with some eighteen hundred illustrations. It is unclear how much of the book, published in London in 1597, was Gerard's own work and how much was the result of plagiarism.

John Norton, the Queen's printer, had originally commissioned a physician called Robert Priest to produce an English translation of Dodoens' *Stirpium historiae pemptades sex* (1583). However, Priest died with the book unfinished and instead of finding someone else to complete the task Norton approached Gerard, who was believed to be working on a book based on his own material.

Born in 1545 near Nantwich in Cheshire, Gerard was a barber surgeon who settled in London sometime before 1577. He had a well-stocked physic garden of his own and looked after gardens belonging to Lord Burleigh. He was known to have wide experience of plants in cultivation in England at that time as well as a reputation for knowing the native flora well. Although Gerard's book was based on work done by earlier herbalists, including Priest's incomplete translation of Dodoens, it also includes his own significant contribution. About half the plants included are native to Britain and more than 180 of those had not featured in any work previously. I wonder how much of these were the result of his own personal fieldwork and what material was provided by his network of assistants. Plants were sent to him from all parts of the world and scattered through the *Herbal* are the names of more than fifty associates.

In all there are some thirteen plants recorded as being found in the Yorkshire Dales.

Cochlearia officinalis b. *alpina*	Scurvy Grass	'Upon a great hill...called Ingleborough Hill'
Hypericum tetrapterum	Square-stalked St.John's wort	'Square St John's grasse, groweth plentifully in the northern parts of England, especially in Craven'
Sedum rosea	Roseroot	'Howgill slate fells, north side between Cautley & Black Force. Ingleborough Fels, neare unto the brooke sides'
Parnassia palustris	Grass of Parnassus	'Very plentifully in Craven'
Erica cinerea	Bell Heather	'Upon Ingleborough hils'
Calluna vulgaris	Heather	'Upon Ingleborough hils'
Pyrola minor	Lesser Wintergreen	'In Craven...in a close called Cragg Close'
Digitalis purpurea	Foxglove	'Those with white flowers do grow naturally in Craven, in a field
Pinguicula vulgaris	Common Butterwort	'In Cragge close...upon Ingleborough fels'
Primula veris	Cowslip-Oxlip	'Master Hesketh's primrose growes in a wood called Clapdale, three miles from a towne in Yorkshire called Settle'
Polygonatum odoratum	Solomon's Seal	'with broad leaves groweth in certaine woods in Yorkshire called Clapdale woods, three miles from a village called Settle'
Scolopendrium vulgare	Hart's Tongue	'Upon Ingleborough hils'
Rubus chamaemorus	Cloudberry	'Upon Ingleborough hils... where the clouds are lower than the tops of the same all winter long, where upon the people of the country have called them Cloudberries, found there by Master Hesketh'

John Gerard is known to have travelled, although most of his botanising was limited to areas easily accessible from his home in London. However, it is also likely that he visited Lancashire and West Yorkshire (Jeffers, 1967). So who was 'Master Hesketh'? Thomas Hesketh (or Hasket) was born at Martholme Hall, Blackburn in Lancashire and practiced as a physician and surgeon in Clitheroe, where he died in December 1613. He was a distant relative of John Gerard as Hesketh's great aunt had married into the Gerard family. Hesketh visited Gerard in Holborn and Gerard travelled to see Hesketh and also stayed with his mother, Lady Hesketh, at Whalley Hall in Lancashire. As Gerard clearly identifies those plants collected by Hesketh it is probable that all the other Dales plants were collected by himself. More of Hesketh later as he reappears as a correspondent of Parkinson.

Gerard reached the peak of his career when he was elected Master of the Barber-Surgeons' Company in 1608. He died four years later. In 1632 Thomas Johnson was approached to revise Gerard's *Herbal*. With rumours that another major British herbal was being prepared (John Parkinson's *Theatrum botanicum*) the new edition of Gerard was completed and printed in under twelve months. It contained many corrections and much additional material (a new set of illustrations and an additional 800 species). It was to remain a standard work for the next two and a half centuries.

Thomas Johnson was born around 1600 near Selby and was apprenticed as an apothecary in London. He had a physic garden in Holborn and is known to have travelled to the West Country, Isle of Wight, Kent & North Wales. Although his botanising trips reached Durham there is no evidence that he collected in the Yorkshire Dales. With the outbreak of the Civil War Johnson was appointed lieutenant-colonel in the Royalist army. He was involved in the siege of Basing House in Hampshire. Wounded in the shoulder he died a fortnight later in September 1644..

Thomas Johnson had been highly critical of Gerard. In the preface to his edition of the *Herbal* he wrote 'our Author endeavoured to perform more than he could well accomplish, which was partly through want of sufficient learning'. The preface also contains a reference to John Goodyer as 'the onely assistant I had in this worke'. The full extent of Goodyer's contribution only became apparent after the rediscovery of his papers over two centuries later.

John Goodyer was born in Hampshire in 1592 and spent his working life as a manorial steward. The son of a yeoman farmer he was probably educated at the local grammar school at Alton, where he became proficient in Greek and Latin. He began buying books on plants to aid him in the identification of the wild flowers he encountered. With all the defects of the early herbals Goodyer would draw up lengthy descriptions of all the new plants he found which were not contained in his books. Goodyer was in contact with Johnson at least by 1618 when they met in London. In 1622 Johnson was sent 27sheets of notes describing over 120 plants. Some of this material was used by Johnson in his revised edition of Gerard's *Herbal*.

On his death in 1664 John Goodyer's library and a mass of manuscript material was to pass to Magdalen College, Oxford, but it remained unstudied until the early part of the twentieth century (Gunther, 1928). In his copy of John Ray's *Catalogus Plantarum* (1657) is a note 'Mr. Tho Thornton, parson of Sutton in Sussex, borne at Bentham in Yorkshire 2 miles from Yngleborowe hill promised Cloudberry 15 Apr. 1663'. Although Goodyer spent his life in Hampshire and did not visit Yorkshire there is evidence that he was in contact with fellow enthusiasts who either lived in or travelled to Yorkshire.

One of these was Richard Shanne (1561-1627) of Woodrowe near Methley in Yorkshire where he created a garden. In the material linked to Shanne are two localities of northern plants. One of these is a Dales plant: 'Pyrola groweth in shadowed woods in Craven, in a place called Craggie Close in Lanscale'. This same plant appears in Gerard's *Herbal* and raises an interesting question. Did Richard Shanne provide John Gerard with the record or did Shanne provide Goodyer with the information which was then used by Thomas Johnson? On balance it is probable that Shanne provided Gerard with the information. In Johnson's text of the revised *Herbal* he clearly indicates those records which he has been responsible for, rather than Gerard. In fact all the records of Dales plants appeared in the original Gerard edition, rather than being additions by Johnson.

Among the Goodyer papers at Oxford is a long list of records made by William How (1620 -1656). A London physician and Royalist officer, he collected together from various correspondents a number of records supplementary to those of Johnson. The first plant with a Dales locality is 'Cirsium anglicum, Single headed thistle' [*Cardus heterophyllus*] with the additional 'Ad radices montis Ingleborrowe copiose inter saxa'. This plant was first recorded by Clusius in 1583. Carolus Clusius, otherwise Charles de l'Ecluse (1526-1609), was a French botanist who settled in Holland. He records 'Provenit in pratis ad radices montis Engleborow...in comitatu Eboracensi'. What was the source of this information? Did he travel to the Dales or was there someone locally who provided the information?

One possible contender is Thomas Penny (c.1530-1588), who was a correspondent of L'Obel, Gerard, Gesner, Clusius and Camerarius. Gerard quotes Clusius who may have received the record from Penny. Thomas Penny was born in Gressingham in Lancashire and educated at Trinity College. He was both a clergyman and physician who had lived in Switzerland and travelled to the island of Mallorca. The Goodyer records also show that Penny provided Camerarius with details of 'Rhodia radix Ingleborrow' [*Sedum rosea*] (Gunther, 1928). This record pre-dates Gerard's so it is possible that Penny was the source for Gerard. Once again there is no positive proof that Penny himself travelled to the Yorkshire Dales and he may have been provided with specimens by family or friends living in the area.

There is another plant in William How's list: 'Ranunculus pumilis floribus deciduis', 'Floret in fine Jun et Jul ad radices montis Ingle-borrow'. This plant is now known as *Ranunculus sardous*.

In summary, the Goodyer manuscripts demonstrate a complex interaction between early botanists. Records from L'Obel were acquired by How who added to them and these in turn were purchased by Goodyer. Before the Goodyer archive reached Oxford it was borrowed by Christopher Merrett who was preparing his own book.

John Parkinson

Born at Bleasdale Moors in Lancashire, he was taught Latin by the parish priest and then, aged fourteen, became apprenticed to an apothecary in London. He rose to become apothecary to James I and was a founding member of the Worshipful Society of Apothecaries. Later he was to be appointed Royal Botanist to Charles I. Parkinson's first book was *Paradisi in Sole Paradisus Terrestris* or *Park-in sun's terrestrial paradise* which was published in 1629. He was a close friend of Thomas Johnson so he felt a deep sense of betrayal when Johnson rushed out a revised edition of Gerard (Parkinson, 2007). In fact, Parkinson's herbal was not completed until 1640 and was published as *Theatrum Botanicum*.

As the book was intended for medical use he organised his plants according to their physical effects: purging plants, counter-poisons and so on. After seven of these categories he described a large number of plants that did not fit into this traditional arrangement. As a busy apothecary, and with all his spare time devoted to developing his garden, Parkinson was unable to travel to collect plants for his herbal. Like all his predecessors he relied on others to provide him with sample and information.

In Parkinson's two books there are four plants listed as having originated in the Yorkshire Dales. The first of these was *Cypripedum calceolus*, or the Lady's Slipper Orchid, found 'in a wood...called the Helkes, which is three miles from Ingleborough, the highest Hill in England, and not far from Ingleton, as I am informed by a courteous Gentlewoman, a great lover of these delights, called Mistress Thomasin Tunstall ... who hath often sent me up the rootes to London, which have borne faire flowers in my garden (*Paradisus* p.348). She also sent him a pink sedum growing 'upon the mountaines of Pendle & Ingleborough often times on the very raggiest places & most dangerous of them scarce accessible & so steepe that they may soone tumble downe that very warily do not looke to their footing'. This plant is *Sedum rosea* (Roseroot). This plant was also recorded in Gerard.

Another plant which appeared in Gerard was Scurvy Grass. 'Hath been also found growing upon Ingleborough Hill ... assured me by a worthy gentlewoman, Mrs Thomazin Tunstall' (*Theatrum* p286). Very little is known of Thomasin Tunstall: she lived 'at Bull-banke, neare Hornby Castle' in Lancashire and was a relative of one of the royal equeries, Sir John

Tunstall. Yet another record which had been included in Gerard's *Herbal* was the Cloudberry. 'First made knowne unto us by Thomas Hasket, a painefull Chirgion, and simplist of Lancashire; but Dr Lobel found it on Ingleborough hilll ... as Mr Bradshaugh ... did likewise'. This implies that Mathias de l'Obel (1538-1616) had found it himself and that the discovery pre-dates that made by Hasketh. And who was Mr Bradshaugh? John Parkinson had been a friend and protege of L'Obel so on the latters death it had been agreed that Parkinson could buy his mentor's manuscripts and papers.

Christopher Merrett

Born in Winchcome in Gloucestershire, Merrett was educated at Oxford University. He practised medicine in London and was a Fellow of the Royal College of Physicians and a founding fellow of the Royal Society. He was appointed first Harveian Librarian of the Royal College of Physicians but following the destruction of the much of the library in the great fire of London and legal disputes with the College authorities he was expelled from the College in 1681 (Dodds, 1954).

He probably began work around 1662 to produce a catalogue of the plants, mammals, birds, fish and fossils found in England. Whilst not being a particularly active field naturalist he enlisted the help of others to provide the material he required. The resulting book *Pinax Rerum Naturalium Britannicarum* was published in 1666. It is a pocket sized volume of 223 pages and almost entirely written in Latin. It is essentially a catalogue arranged in alphabetic order with an index of the common English names. In all he recorded seventeen plants attributed to the Yorkshire Dales, clearly surpassing those recorded by earlier authors.

Arabis hirsuta	Hairy Rockcress	'Between Ingleborrow hill and Settle, among ye rocks'
Draba incana	Twisted Whitlow-grass	'At Clapdale, in Yorkshire...on the rocks'
Geranium sanguineum	Bloody Cranesbill	'On Ingleborough hill'
Sedum anglicum	English Stonecrop	'On the north side of Ingleborough hill, in the mud of the hollow-topped stones'
Saxifraga aizoides	Yellow Saxifrage	'On the north side of Ingleborough hill, near a bog by the side of an underground river'
Saxifraga granulata	Meadow Saxifrage	'A "double flowered" variety is mentioned as having occurred on the west side of Ingleborough Hill'
Meum athamanticum	Spignel	'Sedburg, Yorkshire'
Pulmonaria officinalis	Lungwort	'Under ye rocks betwixt Ingleborough hill and Settle. It hath a large leaf spottedwith black spots, 'tis of areddish colour underneath'
Glechoma hederacea	Ground ivy	'At Wiggles-worth near Settle in York-shire, in hedges'
Persicaria vivipera	Alpine bistort	'Two miles from Settle...in a place called Crommack'
Dactylorhiza incarnata	Early Marsh Orchid	'In the pastures near Settle,Yorkshire'
Cephalanthera longifolia	Narrow-leaved Helleborine	'In Helkwood...not far from Ingleborough'
Allium ampeloprasum	Wild Leek	'At Skirethorn in Craven, going from Mawater Tarn to Perolic Bridge before you come to ye River yt maketh Wharf River in Yorkshire'
Asplenium ruta-muraria	Wall Rue	'On a wall by Mr Wade's house at Kilnsey in Craven'
Asplenium scolopendrium	Hart's Tongue	'Ingleborough hills'

Equisetum telmateia	Giant Horsetail	'At Skippon and Craven'
Barbarea vulgaris	Common Wintercress	'Bank between Ingleborrow Hill & Settle among ye rocks'

So who provided Merrett with these records? In the introduction to the *Pinax* he lists eighteen people who helped him. However, there is meagre evidence for any of these who had a Yorkshire link. One is Gilbert Witham who was rector of Garforth from 1644- 84 (Desmond, 1993). Although he sent plants to Merrett it is uncertain that he ventured into the Yorkshire Dales. In 1668 it was recorded by John Ray that Witham had shown him two species but their localities were not in the Dales.

The only other person who may have provided Merrett with plants from the Dales was Thomas Willisell. Probably born at Briercliffe, near Burnley, in about 1620 (Edmondson, undated) Willisell had been a soldier in the Cromwellian army before turning to botany. He was known to have collected for Merrett as well as for Robert Morrison, the professor of botany at Oxford, and was to accompany John Ray on his travels in Yorkshire. He was also employed by the Royal Society to collect plants on its behalf. He accompanied Lord Vaughan to Jamaica and died there sometime in 1675. It is likely that most of the Dales plants listed in the *Pinax* came from Willisell (Foley, 2006).

Although the first edition of the *Pinax* was published in 1666 it appears that the majority of the copies were destroyed in the Great Fire of London. A copy of the first edition survives in the British Library which is thought to belong to Christopher Merrett, and contains a number of his annotations It is interesting that there are two records of plants from the Dales: *Allium* and *Barbaraea* in the above list.

John Ray

John Ray was born at Black Notley in Essex, the son of the village blacksmith. His early talent was spotted by the local vicar who secured a place for him at Braintree Grammar School. From there he won a scholarship to the University of Cambridge and on graduating became a fellow of Trinity College. He was a self taught botanist whose first published work was a catalogue of plants to be found around Cambridge. Ray became the pre-eminent British botanist of 17th century with the publication of three significant works.

The first was *Catalogus Plantarum Angliae* which was essentially an extension of his Cambridge catalogue to cover the rest of England. Being self taught he was only too aware of the faults of his predecessors. His catalogue was to be based on his own personal knowledge of the flora of England. This would obviously involve extensive travel throughout the country to find and describe plants restricted to particular localities.

Ray travelled to Yorkshire twice to collect material for the first edition. The first journey was undertaken in late June 1660 with Francis Willoughby, a former student and now his patron. Charles Ravenwas able to reconstruct the route taken in his biography of Ray, based on the notes of plants in the *Catalogus*. Willoughby and Ray spent a month botanising over a vast area. They travelled north to Halifax and then to Keighley. There may have been a detour to Pendle before they reached Settle and the exploration of Ryeloaf and Ingleborough. They may have travelled to Northumberland but definitely explored the Lake District before taking a boat to the Isle of Man, before heading south.

The following year Ray set off for the north again. This time he was accompanied by a former student, Philip Skippon, and a servant. However, the expedition seems to have been devoted to visiting the cathedrals and great churches en route. The Yorkshire leg included Beverley, Pontefract, Leeds, Knaresborough, Harrogate, Ripon, York and Scarborough. Having reached Scotland they returned via Carlisle to Penrith and Shap and back to Cambridge. Ray may have collected plants from the Dales in this second journey but it is more probable that they were collected with Willoughby in 1660. The list is impressive:

Trollius europaeus	Globe Flower	'Between Settle & Hinkel-haugh'
Cochlearia officinalis	Scurvy Grass	'Near rills...upon Penyghent & b.alpinaIngleborough Hills'
Draba muralis	Wall Whitlow-grass	'on the mountainsides in several parts of Craven'
Draba incana	Twisted Whitlow-grass	'Ingleborough'
Thlaspi alpestre	Alpine Pennycress	'On the pastures above the Ebbing & Flowing Well, a mile from Settle'
Geranium sylvaticum	Wood Cranesbill	'In pratis montosis...Eboracensis copiose'
Geum rivale	Water Avens	'Circa Settle, Ingleton etc'
Rhodiola rosea	Roseroot	'Ingleborough'
Saxifraga aizoides	Yellow Saxifrage	'Ingleborough'
Saxifraga hypnoides	Moss Saxifrage	'On Ingleborough'
Carduus heterophyllum	Melancholy Thistle	'Ad montium radices Eboraci'
Gnaphalium dioicum	Catsfoot	'On the sides of Ingleborough'
Cypripedium calceolus	Lady's Slipper Orchid	'Helk's Wood, fast by Ingleborough'
Allium oleraceum	Field Garlic	'On the scars above Settle'
Sesleria caerulea	Blue Rock Grass	'In fissures of Ingleborough Hill in dense tufts' the rocks of
Diphasiastrum alpinum	Alpine Clubmoss	'On Ingleborough Hill, abundantly'
Lycopodiella inundata	Marsh Clubmoss	'On Ingleborough Hill'
Hoperzia selago	Fir Moss	'Ingleborough Hill'
Selaginella selaginoides	Lesser Clubmoss	'On Ingleborough'
Asplenium scolopendrium	Hart's Tongue	'Ingleborough'

In 1661 Ray was offered the living of Kirkby Lonsdale. Although he turned this down he had been tempted. He wrote 'One great motive to have induced me to take it was, because of its vicinity to the Yorkshire Alpes, and especially Ingleborough Hill, which is not above sixe or seven miles thence distant' (Gunther, 1928). Shortly after this Ray was to lose his fellowship at Trinity. His refusal to sign the Act of Uniformity debarred him from both the university and ecclesiastical careers. Although he lost his employment he continued his scientific work. In 1668 he returned briefly to explore north Yorkshire and Westmorland. In a letter to Martin Lister he described:

Draba incana	Twisted Whitlow-grass	'in damp places on the flanks of Ingleborough & Hincklehaugh'
Saxifraga oppositifolia	Purple Saxifrage	'on the north side of the summit of Ingleborough'

Thlaspi alpestre	Alpine Pennycress	'around Settle & Ingleborough & elsewhere in Craven'
Meum athamanticum	Spignel	'on the road between Sedbergh & Orton plentifully'

The first edition of the *Catalogus* also contains details of Dales plants supplied by others:

Hesperis matronalis	Dame's Violet	'was found and communicated to me by my often-remembered ingenious friend Mr Martin Lister, in the beck that parts Yorkshire & Lancashire, as you goe from Westby in Craven to PendleHill'
Armoracia rusticana	Horse-radish	'At D. Martinus Lister sponte natam copiose invenit. Upon the banks of Skipton beck & elsewhere in Bolland'
Erodium moschatum	Musk Storksbill	'I have it from Dr. Lister that in Craven it is very common'
Salix herbacea	Dwarf Willow	'On Ingleborough Hill, on the highest rock next to the Beacon, & on a hill called Whernside over against Ingleborough Hill, on the other side the subteraneous river'

In July 1671, accompanied by Thomas Willisel, Ray made another journey north to explore Yorkshire, Westmorland and Northumberland. Again based on plants recorded in the second edition of the *Catalogus* Raven was able to reconstruct the route taken. From Halifax they travelled to Heptonstall and Burnley to Settle. The next leg of the journey took in Shap, Ullswater and then onto Hexham, Newcastle, Holy Island and so on.

The second edition of the *Catalogus* was printed in 1677 and contains new finds from this third visit to Yorkshire:

Thalictrum minus	Lesser Meadow Rue	'Abundant on the mountains near Malham & Settle'
Cardamine impatiens	Narrow-leaved Bittercress	'Among the stones under the scars near Wharf, a village three miles distant from Settle'
Minuartia verna		'On the mountains about Settle'
Sedum villosum	Hairy Stonecrop	'Ingleborough, on the moist rocks going towards Horton-in- Ribblesdale, where peat is got'
Saxifraga oppositifolia	Purple Saxifrage	'Ingleborough, ad latus septentrionale copiosissime'
Polygonum viviparum	Alpine Bistort	'in a mountainous pasture about a mile & a half from Wharf, not far from the foot-way leading thence to Settle'
Epipactis atrorubens	Dark-red Helleborine	Mountainsides, Malham
Polygonatum odoratum	Angular Solomon's Seal	'on the ledges of the scars or cliffs near Wharfe & Settle, plentifully'
Elymus caninus	Dog-wheat	'Circa Settle'
Thlaspi alpestre	Alpine Pennycress	'In many places between Settle & Malham'

Martin Lister (1638 – 1711) was born in Buckinghamshire and on his marriage in 1669 moved to Carlton Hall, near Skipton. So he lived in the area and botanised locally. The following year

he moved to York where he practiced medicine. In 1681 he moved to London and was appointed physician to Queen Anne in 1709.

In 1670 Lister had reported *Polemonium caeruleum* (Jacob's Ladder) to Ray but by error it was omitted from the *Catalogus* (Raven, 1986). He wrote 'grows about Malham Cove, a place so remarkable that it is esteamed one of the wonders of Craven, in a wood on the left hand… as you go to the Cove from Malham plentifully and also at Cordill or the Whern [Gordale Scar], a remarkable cove where comes out a great stream of water, near the said Malham'.

In 1682 Ray published his *Methodus* in which he developed his classification of plants based on plant structures and parts. He then began work on his *History of Plants* which was not merely a list or catalogue but would include descriptions of all the known species. It would also illustrate his method of classification, rather than an alphabetic arrangement of plants. Although he had ceased his extensive travels he continued to add records of Dales plants. The *Historia Plantarum* appeared in three volumes published between 1686 and 1704. However, only the first two contained new records for the Dales:

Volume1(1686)

Potentilla anserina	Silverweed	'Circa Settle'
Botrychium lunaria	Moonwort	'On the mountains near Settle'

Volume 2 (1688)

Elymus repens	Couch-grass	'Circa Settle in agro Ebor'

A third edition of the *Catalogus Angliae* was planned but the printer, Martyn, had died in 1680. The rights had passed to another publisher who refused to pay Ray for the revision of the second edition. So in the end Ray issued a supplement of 32 pages, the *Fasciculus Britannicarum post editum Plantarum Angliae Catalogum observatarum*. There are two Dales plants included:

Actaea spicata	Baneberry	'Among the Shrubs by Malham Cove – T. Lawson' (Ray had already recorded the species in Yorkshire in 1670, but not for the Dales)
Cephalanthera longifolia	Narrow-leaved Helleborine	'Under Brackenbrow, Ingleton, at the end of a wood'

So who was T. Lawson? Thomas Lawson was born at Lawkland, near Settle, in 1630 and was educated at Giggleswick School before going to Christ's College, Cambridge. He left without a degree, possibly through lack of money. It is unclear whether he was ordained but he converted to Quakerism and settled at Great Strickland where he established a school. Inspired by Ray's *Catalogus*, Lawson submitted records to Ray for the projected third edition. Although most of these were for plants found in Cumbria there were also those noted above for the Dales.

Lawson's botanical notebook has survived and is now preserved at the Linnean Society library in London. In it he records a walking tour to London undertaken in 1677. He started by heading for his old home in Lawkland and stayed in the nearby hamlet of Eldroth, having found the Lady's Slipper Orchid on his way through Ingleton. His route then turned west to Manchester by way of Sawley.

Among Lawson's records are the following Dales plants:

Armeria maritima	Thrift	'in Bleaberry Gill under Hinckell Haugh at the head of Stockdale fields in Craven'
Thlaspi alpestre	Alpine Pennycress	'on pastures above the ebbing & flowing well near Giggleswick. In the mountainous pastures between Settle & Malham'
Cardamine pratensis	Cuckoo Flower	'Peny-Ghent'
Saxifraga hypnoides	Mossy Saxifrage	'Malham Cove'
Viola lutea	Mountain Pansy	'Malham Cove in Yorkshire'
Lychnis flos-cuculi	Ragged Robin	'Pen-y-ghent'

Lawson botanised both by himself and on occasions with fellow enthusiasts. One of these was James Newton (1639-1718), about whom very little is known. He may have lived in Leeds and arranged to meet Lawson to explore the Malham Cove area. It is also known that Lawson and Richard Richardson had a joint expedition in 1690. More of Richardson later.

John Ray wrote some monumental botanical works and some of his correspondence with fellow naturalists has survived. Ray also kept a herbarium, a collection of dried plants sewn onto paper and neatly labelled. This collection consists of twenty volumes and is held at the Natural History Museum in London. Although most of the specimens were collected on Ray's foreign tours there are some Dales plants too. These include:

Draba incana	Twisted Whitlow-grass	'in the hill country of Craven'
Saxifraga aizoides	Yellow Saxifrage	'upon the skirts of Ingleborough plentifully'

Dillenius

Johann Dillen, more often known by the Latinised form of his name, came to England from Germany in 1721. He was employed as a taxonomist by James and William Sherard. After lengthy negotiations with the University of Oxford, the Sherards provided an endowment to create the Sherardian Chair of Botany and Dillenius was appointed as the first incumbent. By 1724 Dillenius had produced a much enlarged third edition of Ray's *Synopsis*. It contained many new Dales plants:

Viola lutea	Marsh Pansy	'Settle on the way to Malham'
Thlaspi alpestre	Alpine Pennycress	'on the south side of Ingleborough'
Hippocrepsis comosa	Horseshoe Vetch	'Wherf, Settle, near Malham'
Ribes petraeum	Currant	'Near Settle, 'Bracken-brow'
Gentiana pneumonanthe	Marsh Gentian	'a quarter of a mile beyond Clapham, in a field going the middle way to Engleton – Mr Newton'
Glechoma hederacea	Ground Ivy	'at Wigglesworth near Settle in York-shire, in hedges'
Heracleum sphondylium	Hogweed	'at the Town's-end at Settle'
Crepsis paludosa	Marsh Hawksbeard	'in Craven abundant – Dr Richardson'
Neottia nidus-avis	Bird's-nest Orchid	'In the hedges where Calceolus Mariae grows, near Ingleton – Dr Richardson'
Pseudorchis albida	Small White Orchid	'Juxta Malham - Richardson'

Cephalanthera longifolia	Narrow-leaved Helleborine	'under Brackenbrow, Ingleton, at the end of a wood. Since found in flower by Dr Richardson'
Hymenophyllum tunbrigense	Tunbridge Filmy Fern	'near Settle – Dr Richardson'
Asplenium officinarum	Rustyback	'near Malham Tarne on the chalk rocks – Dr Richardson'

Richard Richardson (1663 - 1741) was educated as a physician and owned an extensive estate at Bierley Hall, near Bradford. After Oxford he spent three years at Leyden and was elected a fellow of the Royal Society in 1712. Although he published very little he was a prolific letter-writer and corresponded with many of the naturalists of the time. Some twelve folio volumes of this correspondence existed at Richardson's death, which was edited by Dawson Turner and extracts published in 1835.

From this it is clear that Richardson was well known to have an extensive collection of north country plants. He supplied Adam Buddle (1660-1715) with the Narrow-leaved Helleborine and Cloudberry in 1709 and sent a collection of mosses in 1721 to Dillenius. The latter also requested a sample of *Orchis spicata* [*Corallorhiza trifida* Coralroot orchid] which Richardson had mentioned growing at Malham. Another letter refers to *Salix herbacea* growing on Ingleborough.

Discussion

On considering the localities of the above plant records it is apparent that the majority come from one small part of the Dales, namely the district of Craven. Most of the records come from Ingleborough, Settle and Ingleton. Have records been missed from other parts such as Wensleydale and Swaledale? Or did the early botanists limit their exploration to the western dales? Perhaps this area was more accessible, when travel was difficult, slow and often limited to horse or foot. Although it is known that John Ray visited Ralph Johnson, vicar of Brignall, they appear to have explored Teesdale, rather than the area to the south. Or perhaps they did explore Swaledale but discovered nothing new to record.

It should be noted that none of the sixteenth and seventeenth century botanists considered above were attempting to compile a comprehensive flora of the Dales. Just over seventy species were recorded compared with over a thousand that currently exist (Frankland, 2001). Instead it is probable that they were searching for uncommon plants as well as those typical of the area. Some of them, such as the Hart's Tongue fern, are relatively common whilst others, for example the Lady's Slipper Orchid, are now extremely rare.

It is suggested that the list compiled by Gerard was based on observations made by himself and his relative, Thomas Hesketh. Gerard's *Herbal* may then have formed the basis of Thomasin Tunstall's exploration of the Dales, within easy reach of her home in Lancashire. She provided Parkinson with confirmation of some of the plants listed in Gerard. Most notably she also provided specimens of the Lady's Slipper Orchid which was then less rare than it is now. Merrett, like Parkinson, relied on others to provide his specimens. Thomas Willisell appears to have been Merrett's principal source. However, the only plant listed in the earlier volumes was the Hart's Tongue fern. Did he miss the others because they were not in flower when he visited the area? Or was he just searching for new species? John Ray both made extensive personal searches of the western dales and also had an extensive network of local botanists. This combination resulted in the most extensive listing of Dales plants.

Clearly there is a paucity of documentary evidence. Whilst more is known of the lives of Gerard, Merrett, Parkinson and Ray very little has survived about the other botanists. There is the opportunity for further local research to discover more about such people as Thomasin Tunstall and Richard Rauthmell. They may well have had copies of the early herbals, and perhaps these have survived. These herbals may even contain annotations with records of localities for particular plants. Perhaps local apothecaries and physicians also had copies of these early books and kept records of plants found in their area. A search of books held in both public and private collections may well add further evidence of the plant life in the Dales in the 16th and 17th centuries.

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YNU Notice:

Conference 2012:
Brownfield sites and their importance for biodiversity

This will be held on 24th March 2012 at the National Science Learning Centre, Siward's Way, University of York, YO10 5DD. The venue has excellent public transport links, with free weekend parking. Those requiring accommodation can book on campus through the University. More details to follow in the next issue of *The Naturalist*.

A Red Kite reintroduction project in the Leeds area

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Introduction

Twenty years or so years ago it would have been beyond the wildest expectations of any Leeds birdwatcher that three new key bird species would have established breeding populations within the City boundary by 2010. Two of them, Avocet *Recurvirostra avosetta* and Common Buzzard *Buteo buteo*, made it under their own steam, whereas Red Kites *Milvus milvus* needed assistance in the form of a reintroduction project based at Harewood Estate. The slow expansion of the Welsh Red Kite population into England had meant that it would have been a long time before suitable areas of Yorkshire would become re-populated from that source. Similarly, the prospect of kites arriving in sufficient numbers from reintroduction projects elsewhere in the UK to re-establish a Yorkshire population would have been an extremely long-term option.

Before their reintroduction into England and Scotland began in 1989, it is likely that anyone who was asked what they knew about Red Kites would have come up with two widely disparate responses. They might have known that, historically, kites were once commonplace in the streets of London, whereas to have seen them in the 1980s would have required a trip into very different surroundings, Central Wales. With luck, they might have had fleeting glimpses of kites which were the progeny of the handful of survivors of the persecution which had annihilated their English and Scottish counterparts some 150 years previously. However, to those in the know, there was a common factor running between historically recorded behaviour of Red Kites and the best places to see them, rubbish! The birds were being attracted to refuse dumps in much the same way that they had fed in and around human habitations in medieval times. Ever opportunist, they would be looking for easy pickings from what humans had discarded.

Description

Red Kites are large birds with a wing-span of around 1.5m (5ft). They have a distinctive long tail, with a fork which is particularly pronounced in adult birds, a feature which makes them unmistakable as new residents in the Yorkshire countryside. Despite their size they are relatively lightweight, females weighing in at around 1200 grams and males slightly less. Their wing-beats are described as crow-like and when gliding or soaring they do so on straight wings, unlike Common Buzzards which hold their wings in a shallow 'V'. In adult birds the breast, belly and upper tail are a deep rufous colour, no doubt the source of the descriptive element of the species' common name.

Reintroduction

The Yorkshire reintroduction project commenced in 1999 and was the fifth in an overall series of ten releases in England (5), Scotland (3), Northern Ireland (1) and Southern Ireland (1). The Yorkshire contribution to this programme was based at Harewood, a few miles north of Leeds. It involved four partnership organisations: Harewood Estate, Natural England, the RSPB and Yorkshire Water. In practical terms Harewood Estate and Yorkshire Water were the key partners, respectively providing secure space for the pens and the funding to mount the project. Backup provided by Natural England and the RSPB, based on a decade's experience of Red Kite releases, ensured that things ran as smoothly as possible.

The first young kites released in England and Scotland in 1989 came, respectively, from Spain and Scandinavia. The first English releases in the Chilterns had prospered so well in the intervening period that, by 1999, it was possible to source the birds for reintroduction in Yorkshire from wild nests in that area without fear of negative effects impacting on that population. It is likely that anyone familiar with the M40, where it passes through a deep chalk cutting in the Stokenchurch area, will have seen Red Kites overhead. That is the area from which the young birds came. During the breeding season, the South of England Kite Group would be checking the nests of their kite population and ringing and tagging the young. If they found a nest with three chicks in, they would keep one of them for relocation to Yorkshire, in the course of a weekend probably collecting 10-12 birds which were temporarily housed in an aviary. They were collected shortly afterwards and brought to Harewood, calling en route at the Institute of Zoology (IOZ) in London for health-checks and the taking of blood samples.

At this stage the young birds were 4-5 weeks old. They could feed themselves and were fully-feathered, no longer needing to be brooded by an adult to keep them warm and dry. At Harewood they were kept in large, specially built, pens measuring 20'x8'x8'. They were released when around 8 weeks old having been fitted with wing-tags and radio-transmitters to enable them to be identified and located. Wing-tags are colour-coded to indicate the area in which the bird was tagged and the year of tagging. Details of the colour codes are shown on the Yorkshire Red Kites website at www.yorkshireredkites.net

Overall, the total number of young kites released in Yorkshire was 68 – the lowest number in any of the UK release projects. This figure was boosted by the arrival of a rehabilitated Chilterns adult kite in September 1999 and an untagged bird of unknown origin which was first seen at Harewood in December of that year. The original plan had been for three releases, totalling 80 birds, from 1999 to 2001. A shortfall of young birds in 2000, caused by a poor breeding season in the Chilterns, and no releases at all in 2001 due to FMD restrictions, resulted in exactly half of the planned number of birds having been released by the end of the original target period. The releases were extended to 2003, but in view of the exceptional early breeding performance of the birds already released (see below), the total was restricted to 68 young birds.

Post-release behaviour

An unknown quantity was what the birds would do once they had been released. Food was provided for them in the release area until they became used to foraging for themselves. This transition took place more quickly than expected, one bird having left the immediate area just 48 hours after being released. It was located in a field a couple of miles or so away, paddling around in recently spread slurry, apparently feeding on worms which had been brought to the surface. This was an early indication of the significance, in terms of food supply, of the many and varied agricultural processes which occur in the area during the course of a year. This bird and several others soon began to explore further afield. Through radio-tracking them into new areas, contact was made with many landowners, farmers and gamekeepers. It was reassuring to hear from them that they were aware that kites were primarily scavengers which did not constitute a significant threat to their interests.

Breeding

Several birds from the first release in 1999 moved eastwards, to the southern end of the Yorkshire Wolds. A pair settled on an estate near South Cave, where they bred in 2001 raising two young. This was no flash in the pan as had been pessimistically suggested. It was the beginning of a satellite Wolds breeding population which is growing slowly from year to year. They have been joined by other kites from Harewood – one pair which settled in the Wolds in

2004 consisting of a male which was one of the last releases there in 2003 and a female of the same age which had been raised in a Harewood nest. A male from a 2004 Midlands nest is part of a successful pairing which has bred since 2006. Visiting kites from North Scotland and Northern Kites, based near Gateshead, have also been recorded in the area. The establishment of this Wolds population is a major and totally unexpected bonus in the process of restoring these spectacular birds to the county's fauna.

Equally unexpected were events at Harewood. In 2000, the rehabilitated adult female had paired up with a one-year-old male. They bred successfully, raising two young. In 2001 one of these young birds paired up with a bird released in 2000, raising one young. Having a kite which was a grandfather at two years old was in stark contrast to expectations that initial successful breeding might occur after 2-3 years! The untagged bird of unknown origin, 'the volunteer', in turn boosted the breeding figures by raising 3 young in 2001. It was particularly fortunate that both the rehabilitated bird and the volunteer had turned out to be females, as it transpired that the first batch of 20 young released in 1999 consisted of 14 males and only 6 females! The sexes of the young released birds were determined by the analysis of blood samples taken by IOZ which showed an overall 2:1 bias in favour of males. The plumage of the sexes is identical and it is thought likely that the unequal ratio of sexes was influenced by the smallest chick in the nest having been selected for relocation. The logic behind this was that the smallest was the least likely to survive if there was a shortage of food, though it apparently took no account of males being slightly smaller than females. The unscheduled arrivals of the two additional birds in 1999 not only helped to partially redress the overall imbalance of sexes, but also resulted in successful breeding in the project's first year – a feature unmatched, to date, in any of the other eight kite reintroduction projects which have passed that stage.

In spite of the various obstacles placed in its path, the Yorkshire project experienced an early breeding performance which was way above expectations. Moreover, it was unprecedented in any of the other release projects. A comparison of the Yorkshire breeding figures in the three years up to 2002, with those from six other projects at their respective three-year stages, reveals the spectacular progress made here. A remarkable total of 37 young had been raised, against a combined total of 50 from the other six areas.

The Yorkshire breeding figures for 2010 were:

Area	Pairs found	Pairs bred	Pairs successful	No. of Young
West Yorkshire	43 (41)	42 (38)	40 (37)	85 (69)
North Yorkshire	33 (28)	27 (24)	23 (23)	46 (39)
East Yorkshire	8 (8)	8 (5)	7 (5)	16 (9)
Totals	84 (77)	77 (67)	70 (65)	147 (117)
Average number of young raised per successful pair = 2.10 (1.78) 2009 figures shown in brackets				

Undoubtedly there have been pairs which have gone undetected or unreported. Nevertheless, the figures based on confirmed breeding pairs show that around 700 young have been raised in Yorkshire nests since the reintroduction of kites began here in 1999.

Sixteen of the young raised have a parent which originated from the Northern Kites release. It is an intriguing story. In 2004 the Yorkshire Project Officer trained his Northern Kites counterpart in fitting wing-tags and radio-transmitters. He processed the bird fitted with the

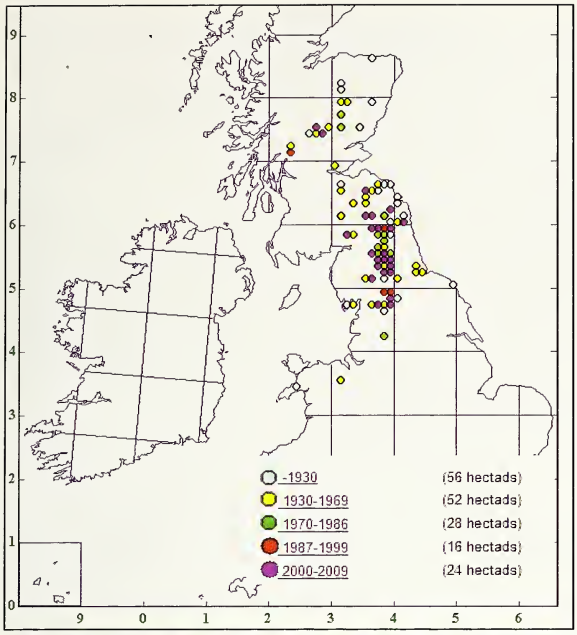

Plate I (See p90)
Left: The hectad distribution of *Crepis mollis* in Britain and Ireland.
Below: *Crepis mollis* growing at Starbottom, Wharfedale. *K.Walker*

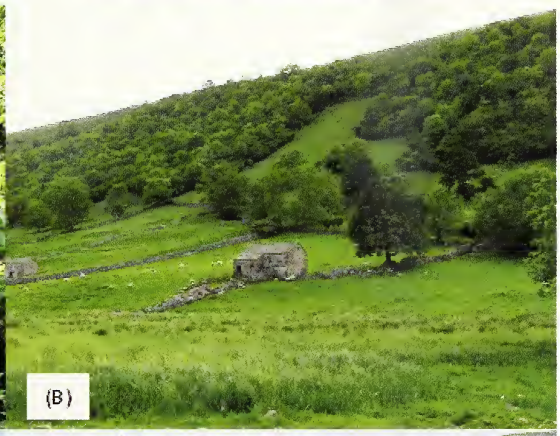

Plate II. The habitats of *Crepis mollis* in Yorkshire (VCs 64 & 65): (a) wooded limestone pavement, Colt Park Wood NNR, Ribblesdale; (b) steep pasture amongst woodland, Starbotton, Wharfedale; (c) unimproved species-rich bank in pasture, Worton, Wensleydale; (d) unimproved species-rich bank in hay meadow, Holwick, Teesdale. *K.Walker*

Plate III (see p129). Photo of the displays at Leeds City Museum c.1930 from the museum's archives.

C.M.Brown

Plate IV (see p129). Greak Auk bones as currently stored at Leeds Museum. Note the mandibles, bottom right.

J.Bowers

Plate V.
(See p 148)
Dragonfly Conservation Area, Rodley Nature Reserve.
Google - Imagery ©2011 Infoterra Ltd & Bluesky, GeoEye, The Geoinformation Group, Map data ©2011 Tele Atlas.

Plate VI. (see p149)

Right: Pond established during Phase 1.

Below left: The long ditch during laying the underlay. Note the liner in position close to the bridge before unrolling.

Below right: The long ditch just after planting out.

B. Murphy

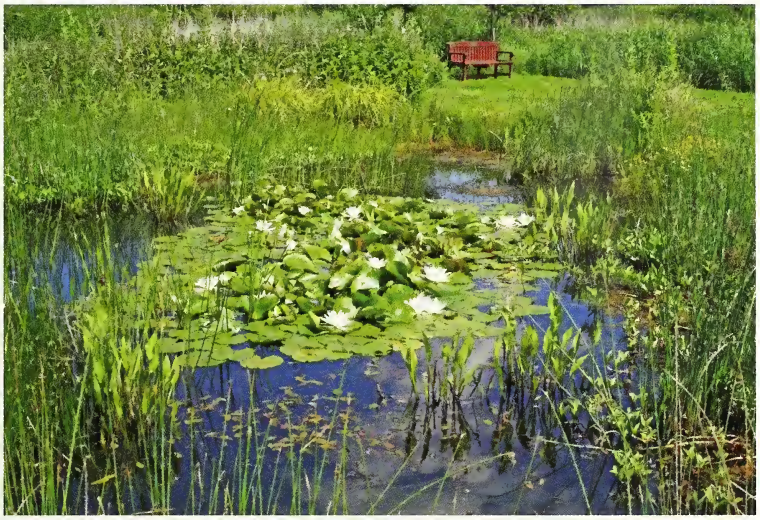

Plate VII. (see p152)

Pupa of *Scirtetes robustus* (on left), with parasitised caterpillar of the Dun-bar moth *D.Parkinson*

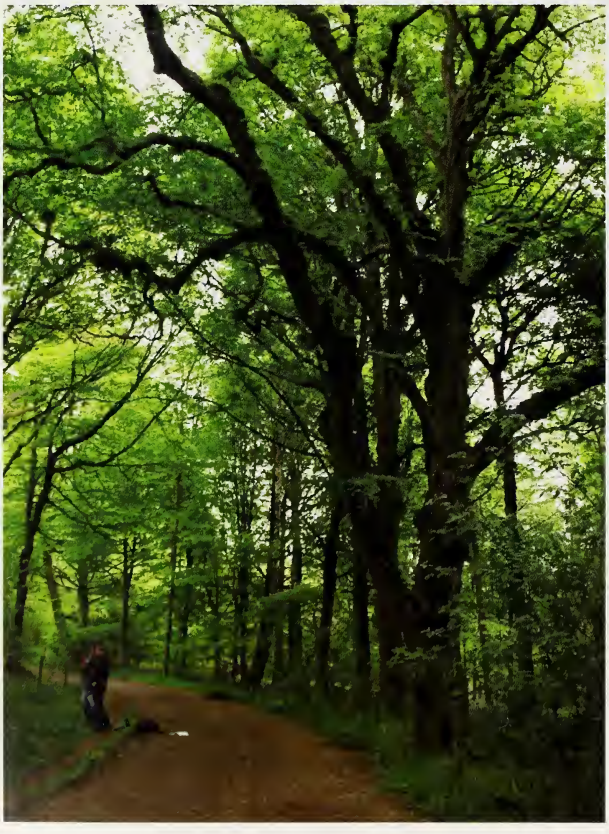

Plate VIII. (see p153)

Left: Hornbeams along Hollybank Lane, Ripley.

Above: The witches' broom gall *Taphrina carpini* on Hornbeam in Harlow Carr Gardens, Harrogate.

J.Newbould

colour-coded tags Pink/Yellow 1, a male, and then watched whilst tags were fitted to Pink/Yellow 2, a female. After they were released, both birds left the area and eventually settled near Harrogate where they found Yorkshire partners. They have bred successfully each year since 2006. In 2010, Pink/Yellow 1 moved breeding sites to within three miles of the home of the Yorkshire Project Officer, who had tagged him six years previously in Tyne and Wear.

Communal roosting

Red Kites roost communally in winter and pre-roost gatherings can be spectacular occasions in suitable weather conditions. On two occasions the Harewood roost has produced counts in excess of 100. Of equal interest are the two roosts more recently established in North Yorkshire and East Yorkshire. Although the numbers are nothing like those at Harewood, monitoring through the winter of 2010/11 showed that the numbers held steady through the hard weather, peaking at 26 and 23 birds respectively. This was a useful indicator of how the birds had fared in one of the hardest winters since releases began. Some birds are known to stay on their adopted territories outside the breeding season, so the numbers seen at roost do not necessarily represent the whole of the populations in these areas.

Feeding habits

Kites have a wide dietary range. They are primarily scavengers, drifting around on their long buoyant wings, looking for food items on the ground. They do not have the strength or power associated with those bird of prey species which rely on their hunting skills for survival. Although they are capable of taking small live items such as mice, voles and small birds (their partiality to Lapwing chicks being one of their more unfortunate habits) kites rely chiefly on carrion as their basic food source. They are often reluctant to land, snatching up their food from the ground and either feeding on the wing or taking it into a tree and feeding whilst perched. If the food item is too large to carry off, they may land on the ground – though they are very wary and often wait until crows or buzzards have fed first, as though they are making sure that it's not a trap!

Surveys have shown that, as might be expected, Rabbit and Brown Hare form a significant part of their diet. If carrion isn't available, they will look for other food sources. Agricultural operations, such as ploughing, grass-cutting for hay or silage and the harvesting of crops all provide kites with foraging opportunities. Like gulls, they will follow the plough, no doubt looking for worms. They will take advantage of any small mammals which become casualties of the processes of ground preparation, seed sowing or harvesting. Food obtained from such a source is a significant supplement to their customary diet of carrion, located by their vulture-like searching of the countryside. There have been many reports from workers on the land of the spectacle of kites wheeling around above them in the fields.

Red Kites in urban areas

Reference to the topic of food raises the further question, whether kites are likely to be witnessed feeding in the centre of Leeds much as they had done in London in the 15th century. It is pure speculation to suggest that kites might once have been commonplace in the streets of Leeds, though there is no reason why this should not have been the case. That they might become so again is highly unlikely for a number of reasons. Kites lost their protected status in the 16th century as a result of the introduction of the 'Acte for the Preservacion of Grayne', rewards being offered for their heads. This action, in conjunction with gradual improvements in hygiene arrangements and the consequent reduction of the kites' food supply, would ensure that it was never again likely to be so numerous in urban areas. These areas have changed so much that they no longer offer kites the opportunity to forage for food,

as they once might have done. An opportunist kite flying over urban areas of Leeds might find the occasional meal, but it is doubtful that food would be available on such a regular basis that a sustainable urban kite population could develop. It is much more likely that those kites which are being seen increasingly over suburban areas around the city fringe (Seacroft, Roundhay, Meanwood, Chapel Allerton, Moortown, Alwoodley, Adel and, very appropriately, Gledhow[4]) are birds resident in rural areas which make speculative forays over adjacent highly populated areas. They might strike it lucky sometimes, such as the bird seen taking a chicken carcass from a Meanwood garden, but it is doubtful that present day hygiene and waste disposal regulations would permit the availability of a regular and reliable supply of appropriate food in urban surroundings.

Feeding Red Kites

It is evident, from the number of enquiries received on the topic, that the presence of Red Kites is closely associated with the provision of feeding stations. This correlation stems from several such attractions established in other parts of the UK. Although the Red Kites undoubtedly produce a spectacle when food is wheeled out for them at the appointed hour each day, questions arise as to whether such a regular practice is a good idea when closely associated with attempts to establish a reintroduced wild population. Although best practices adopted at feeding stations ensure that food is not provided until well after midday, so as to encourage the birds to forage naturally for food earlier in the day, there is an inevitable risk that they might become dependent on such regular handouts. This prompts the further question of what effect the regular provision of food in one location might have upon the distribution of a growing, reintroduced, population.

There had been an initial proposal for a feeding station at Harewood, though it is perhaps as well that it did not go ahead. This would have undoubtedly prompted criticism that feeding was responsible for the high concentration of successful breeding pairs on Harewood Estate and in the immediate area. It could have been contended that the regular provision of food had prevented the birds from spreading further afield. In fact, there can be little doubt that the presence of so many birds in that area is down to it being highly suitable Red Kite habitat which is naturally capable of sustaining such numbers. In 2009 the average number of young (1.85) raised by 26 successful pairs breeding on Harewood Estate was slightly higher than the overall Yorkshire average (1.78) – the figures for 2010 showing parity at 2.1.

The ethics and wisdom of seeking to attract kites to domestic gardens by putting food out on a regular basis is a frequently occurring topic. There are several issues involved here. Again, the main emphasis is upon establishing a wild, independent, kite population. There are also potential social issues involved. Neighbours might object to both the regular provision of food and the actual presence of the birds. A kite health issue could also arise, particularly in the breeding season. A calcium deficiency was diagnosed in at least two of the young kites relocated to Harewood from the Chilterns. One suffered spontaneous bilateral fractures of the bones in its legs: in simple terms its legs could not bear its weight. It had to be euthanased. Another responded to treatment, involving the provision of supplementary calcium in its food. It was considered likely that the problem had arisen through the young birds being provided with inappropriate food items at a critical period in their growth. A practice had developed in the Chilterns of attracting kites into gardens and feeding them on burgers, sausages and suchlike items, no doubt containing the customary multitude of food additives. In the ordinary course of events, this might not have a detrimental effect on an adult kite which would probably consume

[4]It is likely that this name has its origins in the presence of kites or buzzards in the area in years gone by - 'gled' or 'glead' being old names attributed to these species.

food from a variety of sources, natural or otherwise, in the course of a day's foraging. However, it could be a very different matter if a significant proportion of the food provided for young birds in the nest was lacking in essential constituents such as calcium.

Poisoning by illegal baits

Food additives of a more sinister nature have become an increasing concern in Red Kite reintroduction areas. Since releases began in 1999, there have been at least 20 Yorkshire-related kite deaths due to them having fed on poisoned baits. There is no evidence that Red Kites are being deliberately targeted, the likely explanation being that they have found poisoned baits laid out in the countryside in attempts to kill vermin species, such as crows and foxes. It is a totally indiscriminate means of attempted pest control, for which reason it has long been illegal. The regular toll of kite deaths from this cause is a clear indicator that it is a practice which still widely persists. Four such deaths occurred in Yorkshire in 2010. This included two three-week old chicks in a nest, the only plausible explanation being that they were fed poisoned food by their parents; it is not known whether they also succumbed. It is well nigh impossible to establish who is responsible, even less so to obtain the evidence essential to mount a successful prosecution, for which it is necessary to establish a direct causal link between the person who laid the poison and the death of the victim. Such cases very rarely clear the first hurdle, that of establishing who laid the poison. Indeed, it is unusual to actually find the poisoned bait, the birds having possibly flown some distance before the poison took effect.

There have been only two Yorkshire incidents in which the bait was found, one of these involving a small piece of rabbit, no doubt intended to be carried away and fed on elsewhere. The other occurrence accounted for two kites, a crow and a fox. All had fed on a rabbit which had been dosed with a horticultural insecticide. Where the bait is not traced, analysis of samples from the dead birds can determine the identity of the poison and give an indication of the dosage level. A number of different substances are used, some of which are no longer licensed for the purpose for which they were originally intended. Others are products which have been formulated and currently licensed for specific agricultural or horticultural purposes, their use for any other purpose being an offence.

Poisoning by rat poison

The widespread use of rat poison poses another threat to Red Kites and other scavenging species. Such poisons are often referred to as being first or second generation. The first generation substances, such as warfarin and coumatetralyl, present a lesser risk to wildlife feeding on them but, unfortunately, there are geographical areas in which it is officially recognised that the rat population has developed resistance to them. This has inevitably led to the development of more effective, second generation, poisons. Some of these are (too) easily obtainable – formulations based on difenacoum and bromadiolone being readily available for purchase by the general public.

There is a serious risk that the ease with which rat poisons can be obtained will result in them being used by inexperienced operatives. In such circumstances it is likely that more of the poison would find its way into the natural environment than would be the case if it was applied by an expert, who would effectively and economically target appropriate key areas. There is a temptation to go for a 'quick fix' instead of adopting a planned programme devised by a professional. Part of a management programme is to ensure that regular inspections are made and dead rats removed before they find their way into the food chain. Since 1999, seven Yorkshire Red Kites are known to have died from the effects of consuming rats which had been killed by rat poison. All kites which are submitted for poison analysis are routinely tested

for rat poison. It is of particular concern that the seven Yorkshire birds which are known to have been poisoned in 2010 (four by illegal poison baits and three by rat poison) all tested positive for at least two different rat poisons (difenacoum and bromadiolone). Traces of a third substance (brodifacoum), which is strictly licensed for indoor use only, were also found in two of them. The ease with which poison substances can enter the food chain is demonstrated in the case of the two poisoned three-week old kite chicks referred to above. Analysis showed that, during their brief lives, they had ingested the rat poisons difenacoum and bromadiolone, in addition to the carbofuran which actually killed them! Carbofuran is an insecticide, the use of which is banned in the EU.

Effects of lead

Lead, in the form of shot used for shooting, presents two different problems for kites. The more obvious of these is kites being shot at and either killed or injured. As is the case with poisoning, it is impossible to determine the full extent of the problem. However, several birds which have died from other causes have been found, on X-ray examination, to have been carrying one or more lead pellets, having clearly been targeted at some point. Known casualties include a Yorkshire bird shot dead in Lincolnshire and a Midlands bird shot and injured in East Yorkshire which was released after treatment for a broken wing. Most recently, a Cumbria bird reported on the Yorkshire Red Kites website had been shot in Dentdale, just three weeks after being released in the Grizedale Forest.

A more insidious effect of lead on kites and other scavenging species is poisoning brought about by lead ingestion through feeding on prey which has been shot. This is a catch-22 situation. There can be little doubt that reintroduced kites have benefited significantly from food available on shooting estates. This may be in the form of pheasants or partridges which have been shot but not retrieved or rabbits which have been shot and left out. Shooting by rifle presents less of a risk to birds scavenging on such prey, the bullet usually passing straight through the target. However, testing has revealed that this method is by no means foolproof, minute fragments of lead breaking away from the bullet on impact and being retained in the flesh around the wound. This factor came to light following blood tests on young kites prior to them being released in Yorkshire. These showed raised lead levels compared with those revealed in tests undertaken 2-3 weeks earlier. It was concluded that residual lead fragments in rabbits fed to the young birds whilst in captivity were the likely cause.

An in-depth study (Pain *et al.*, 2007) into the likely effects of lead ingestion by Red Kites found that lead poisoning was likely to have been the cause of death of 9% of those birds found dead for which liver samples had been analysed. The study was able to distinguish between lead used as ammunition and that derived from other sources, such as lead in petrol. It concluded that:: "The risks of Pb poisoning to this species ..... will not be eliminated until lead ammunition for hunting ..... is banned and replaced with non-toxic alternatives."

Notwithstanding these findings, there is still no routine procedure to test for the presence of lead in dead kites.

Rehabilitation of casualties

It is inevitable that injured kites will be found from time to time. Whenever feasible they receive urgent veterinary attention. Those unlikely to recover sufficiently to enjoy a good quality of life are euthanased. Others, with less serious injuries from which they stand a good chance of making a full recovery, often require a period of recuperation and assessment to determine their suitability for release. Until relatively recently, this presented a considerable challenge, accommodation suitable for this purpose being difficult to find, Ryedale Rehab at Malton

having helped out on a couple of occasions. The problem has now been resolved by the erection of a rehabilitation pen at Harewood (Fig.1), where the occupants can be discreetly observed. The primary funding for the pen came from Yorkshire Water, who also supplied the manpower to construct the prefabricated sections and erect them on-site. Top-up funding to complete the work came from Yorkshire Wildlife Trust. The pen is 20' long x 8' wide x 8' high – the same dimensions as the original release pens. The sides and roof of the central section are mesh and there is a sheltered area at each end where the occupants can perch out of the worst of the weather. There is also a facility for keeping a bird closely confined whilst, for example, broken wing bones are mending.

Figure 1. Red Kites in the rehabilitation pen at Harewood *D. Simpson*

The pen is located in a quiet part of the estate and its occupants are looked after by staff from Harewood Bird Garden. This is an ideal arrangement, amongst other things enabling the staff involved to add 'Assistance in the rehabilitation of wild Red Kites' to their CVs!

All but one of the several kites which have benefited from this facility were released after recuperation. The exception was a bird which had suffered a wing fracture which had self-healed before it was found. Unfortunately it could not fly properly and was unlikely to have survived had it been released. It was otherwise in very good health. A home was found for it at the International Centre for Birds of Prey at Newent in Gloucestershire.

Monitoring the progress of the population

In the early days of the Project, monitoring the movements of the birds was a relatively straightforward process. They were fitted with radio-transmitters: initially tail-mounts which moulted off after approximately 12 months, and subsequently harness-mounts with an effective life of 30 months. No transmitters have been fitted since 2006, all monitoring now being undertaken on a purely visual basis. A key indication of progress lies in detecting territorial pairs and determining the outcome of any breeding attempts. This has led to a wealth of information being collated about breeding sites. Monitoring is now undertaken by a team of volunteers known as Yorkshire Red Kites (YRK). RSPB financial support for this work came to

an end once the population reached 50 pairs, albeit that the majority of them were in a relatively confined geographical area based around the Harewood release site. As Red Kites are listed in Schedule 1 of the Wildlife and Countryside Act, monitoring is undertaken under licence from Natural England.

The population has continued to expand both numerically and geographically, financial backing for the monitoring having been provided by the Yorkshire Wildlife Trust since 2009. As the birds spread out and settle in new locations, information reporting their presence received from landowners, farmers, gamekeepers, golf course personnel, members of the public, etc., has become an increasingly useful means of plotting their progress. Cold-searching for nests is not a particularly productive means of finding new pairs, there being literally thousands of potentially suitable tracts of woodland in the county in which the birds may settle. Much time and effort can be saved if people on the ground report regular sightings of birds on newly established territories to the YRK website at www.yorkshireredkites.net.

Significance of the UK population

In recent years there have been dramatic reductions in the Red Kite populations in some parts of France, Germany and Spain. The causes include modernisation of farming methods, rodenticides, uncontrolled use of pesticides and illegal persecution. This unfortunate turn of events shows the increasing importance of the growing UK population in an overall European context. It was extremely fortuitous timing that the sourcing of young kites from Spain took place when it did, it being highly unlikely that the authorities there would release any birds now from their significantly depleted population.

Conclusion

We are particularly fortunate to have witnessed the unfolding of a major conservation success story based on the northern outskirts of Leeds. The ease with which these large birds can be seen and identified has brought a tremendous amount of pleasure to lots of people. Many have said that their presence has added another dimension to the countryside around Leeds and beyond. Others have referred to the 'lifting of spirits' which they feel on seeing them, especially those who are on their way to work in Leeds on a gloomy Monday morning! The project has undoubtedly awakened many people to nature conservation issues of which they were previously unaware, as well as highlighting various continuing threats to wildlife in the countryside. The overall message is, however, extremely positive and, as Project Officer for the Yorkshire reintroductions, I have derived inestimable pleasure and satisfaction from my involvement in restoring these magnificent creatures to the Yorkshire countryside.

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Great Auk material at Leeds Museum*

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Introduction

Remains of the extinct Great Auk *Pinguinus impennis* (L. 1758) are well documented. They have been subjected to many published lists and reviews (for example, Fatio, 1868 and 1870, Newton, 1870, Grieve, 1885 and Fuller, 1999), and have been coveted since the extinction of the bird in 1844 (Fuller, 1999). Although the eggs and mounts of these animals have attracted most attention, the whereabouts of any Great Auk osteology has also been well recorded. A description of the osteological Great Auk remains held by Leeds Museums and Galleries has never been published. Indeed, their provenance remains a mystery: how did material from such an important species enter the collections at Leeds anonymously and without comment?

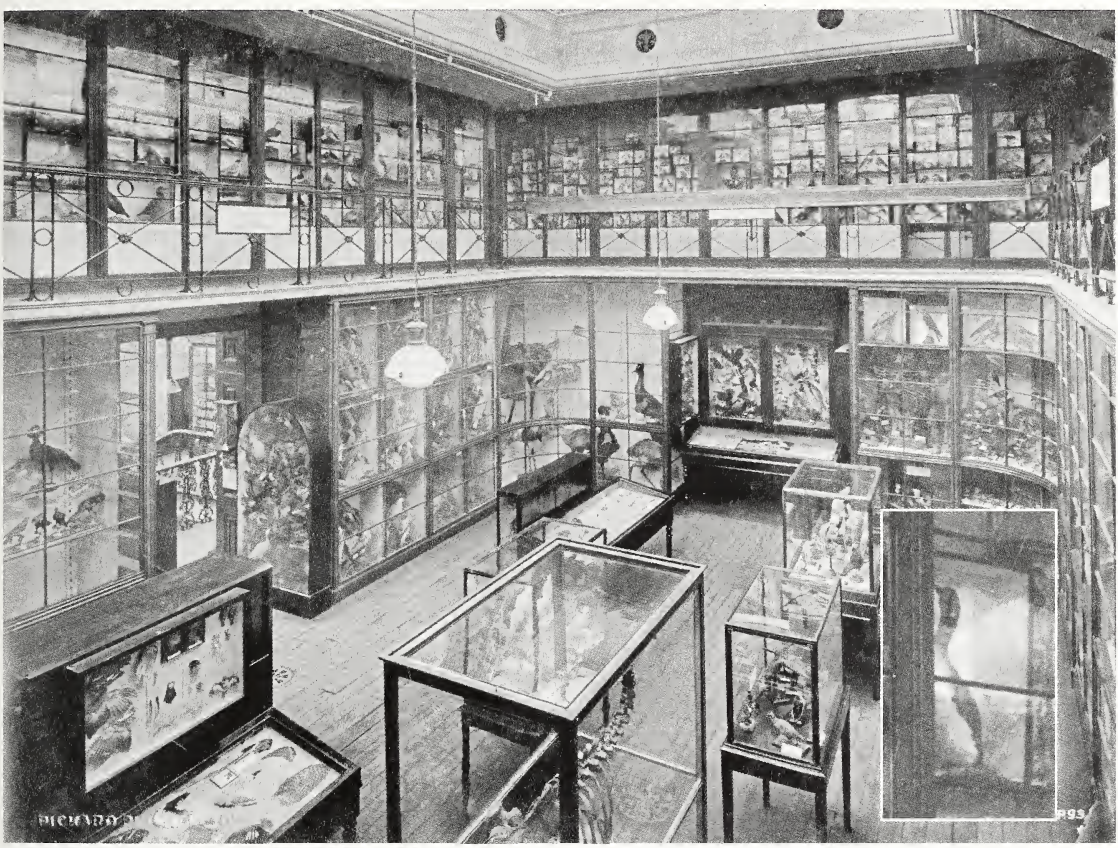

Figure 1. The Milner collection of British Birds on display at The Philosophical Hall , Park Row, Leeds c.1900 with detail of one of the birds (gallery level, left of centre). *C.M.Brown*

Great Auk material in Leeds

There appear to be no records of osteological remains of Great Auk in the reports of the Leeds Philosophical and Literary Society (*LPLS Annual Reports*, 1820-1922), the founding organisation of the current collections at Leeds Museum. There are no obvious records of the bird in the more modern accession registers of Leeds Museums and Galleries. Leeds did,

however, have a mounted Great Auk specimen for a time. It was loaned to the museum of the LPLS at the end of the 19th century:

> "35. Leeds, Yorkshire, England. – This [mounted Great Auk] is now in the Museum of the Philosophical Society of Leeds, who got it on loan from Sir Frederick Milner, the son of Sir William Milner, in whose collection it was for many years. Sir William was led by I Graham, a bird-stuffer of York, to believe that it came from the Hebrides (see Newton in *Ibis*, 1861, p.398), but Newton, writing to Blasius a few days back, says that he has every ground for believing that this specimen was originally given by Gardiner to Mr. Buddicorn, and that it comes from Eldey, in Iceland." (Grieve, 1885, p. 151)

There is a photograph of a display of the Milner collection in the archives of Leeds Museums and Galleries (Fig. 1). In the top right corner of the gallery stands a bird which could possibly be a Great Auk but is more likely to be a Goosander or a species of Diver.

The funds could not be raised by the LPLS to purchase Milner's Great Auk when it came up for sale and it was sold in 1895 (Chalmers-Hunt, 1976) to the National Museum of Scotland where it still resides. There is no mention of this in the LPLS reports for that year (LPLS Annual Reports, 1895 and 1896) although there is a rather sad 'Globe Parcel Express' receipt for the bird's transport to the auction in London in the archives at Leeds Museums and Galleries. The photograph in Figure 1 is dated c.1900 and so it may well be that the Great Auk had been sold by then and so was not on display. In the end, Edinburgh was probably the best place for the specimen as the bird halls at the City Museum in Leeds were almost completely destroyed by enemy action in 1941.

However, the desire for a Great Auk at Leeds, a species that could be found in other great natural history collections around the country, led to the purchase of a Great Auk model. Made of seabird skins (probably Razorbill) by a taxidermist in Carnforth, Lancashire, the model is still held by Leeds Museums and Galleries (LEEDM.C.1953.40.10536). Although they did not obtain a mount, the LPLS received three Great Auk egg models on three separate occasions, such was their popularity: in 1888 from Mr. G. A. Widduw of Leeds (LPLS Annual Reports, 1888-1889, p.14), in 1900 from Mr. Alfred White F.Z.S of Leeds (LPLS Annual Reports, 1900-1901, p.13) and in 1903 from Mr. W. T. Crampton of Roundhay (LPLS Annual Reports, 1903-1904, p.16). One model egg remains in the collection at Leeds (LEEDM.C.2011.44) but as is the case with some museum specimens, unless new information comes to light it is currently impossible to establish which of the three original eggs it is. The rarity of, and desire for, Great Auk eggs pushed their value up: "A very fine specimen which came into the market some years ago realised 315 guineas." (Lydekker *et al.*, 1911). With the high prices commanded by such eggs, it is little wonder that even models were considered worthy of a place in the LPLS museum.

Great Auk osteology at Leeds

In 2008, staff at Leeds Museum Discovery Centre were sorting bones from a box marked 'Dodo Bones'. The intention was to put together an articulated Dodo skeleton for display at Leeds City Museum, due to open in the September of that year. It soon became clear that not all the osteological material in that box belonged to the Dodo. Thirty of the bones were a different shade of brown and were much slighter than the rest of the collection; it was speculated that this might be Great Auk material.

Interestingly, a photograph of bones on display at Leeds City Museum, thought to be c.1930 with the label "Bones of the extinct Dodo", clearly shows both the heavy, darker bones on display alongside the lighter, slimmer bones (Plate III, Centre pages).

The identification of these bones was eventually verified as Great Auk by direct comparison with the Yorkshire Museum's collections: "Eight bones from Funk Island, off the Newfoundland Coast, in 1880, have been labelled: femur, tibia, pelvis and lower mandible" (Denton, 1995).

The provenance of the Leeds Dodo bones has been documented (Higginson, 1891) and is well known: the material arrived in Leeds in two lots, an 1865 purchase (LPLS Annual Report, 1866, p. 13) and an 1866 gift by Higginson himself (LPLS Annual Report, 1867, pp.7-8). Although there are no records of the Great Auk material coming into the collections, someone must have correctly identified the bones at one time for them to be in the same box, and under the same label, as the Dodo bones. Either that or some other complication arose with a description along the lines of "bones of an extinct bird". It is highly unlikely that the remains of two species of important extinct birds ended up in the same box by accident.

Whatever the more recent history of the material, it is probable that the Great Auk bones were either not in Leeds, or not recognised as Great Auk bones, in 1885. Symington Grieve's 1885 publication 'The Great Auk or Garefowl' takes care to list the "Detached Bones" to be found in collections, public or otherwise, around the world. He mentions the York collection: "In the museum are seven bones that were purchased some time ago from Mr. Edward Gerrard, jun., London. They are part of Professor Milne's find on Funk Island..." but does not list any bones at Leeds (Grieve, 1885). Grieve must have been aware of the natural science collections at Leeds through R. Champley because he describes the 'skin' on loan to Leeds at the time. Fatio mentions only a handful of "squelettes" and none of these at Leeds (Fatio, 1870). Newton, also writing a catalogue of remains in 1870, records "detached bones" only at the British Museum, the Royal College of Surgeons, the Hancock Museum in Newcastle and within his own collection. If the Leeds specimens were held by the LPLS at this time (and identified as Great Auk), they would surely have featured in these inventories.

Catalogue of the specimens

There are thirty Great Auk bones, from at least three birds, held by Leeds Museums and Galleries (see Plate IV, Centre pages):

Accession Number	Bone	L (mm)	W (mm)
LEEDM.C.2010.179.1	Left tibiotarsus	125.5	15.0
LEEDM.C.2010.179.2	Left tibiotarsus	130.6	17.0
LEEDM.C.2010.179.3	Left tibiotarsus	129.4	15.9
LEEDM.C.2010.179.4	Right tibiotarsus	133.1	16.4
LEEDM.C.2010.179.5	Right tibiotarsus	137.9	15.8
LEEDM.C.2010.179.6	Synsacrum	98.0	19.1
LEEDM.C.2010.179.7	Left tarsometatarsus	51.4	14.1
LEEDM.C.2010.179.8	Left femur	71.3	14.3
LEEDM.C.2010.179.9	Right femur	68.4	13.9
LEEDM.C.2010.179.10	Left coracoid	60.9	25.1
LEEDM.C.2010.179.11	Sternum (fragment)	166.4	74.7
LEEDM.C.2010.179.12	Pelvis (fragment)	83.5	22.4

Accession Number	Bone	L (mm)	W (mm)
LEEDM.C.2010.179.13	Pelvis (fragment)	93.1	21.3
LEEDM.C.2010.179.14	Sternum (fragment)	42.2	19.0
LEEDM.C.2010.179.15	Pelvis (fragment)	65.7	19.2
LEEDM.C.2010.179.16	Sternum (fragment)	69.0	61.0
LEEDM.C.2010.179.17	Synsacrum	96.6	22.3
LEEDM.C.2010.179.18	Furcula (fragment)	63.6	9.1
LEEDM.C.2010.179.19.1 & 2	Furcula (in two parts)	77.0	9.6
LEEDM.C.2010.179.20	Upper mandible (fragment)	100.9	18.9
LEEDM.C.2010.179.21	Lower mandible (fragment)	131.1	29.0
LEEDM.C.2010.179.22	Pelvis (fragment)	84.2	20.6
LEEDM.C.2010.179.23	Cranium (fragment)	55.2	48.9
LEEDM.C.2010.179.24	Cranium (fragment)	32.8	44.7
LEEDM.C.2010.179.25	Vertebra	21.6	19.2
LEEDM.C.2010.179.26	Vertebra	16.8	23.8
LEEDM.C.2010.179.27	Rib	70.9	8.1
LEEDM.C.2010.179.28	Rib (fragment)	47.2	3.2
LEEDM.C.2010.179.29	Rib	110.3	5.3
LEEDM.C.2010.179.30	Rib	157.9	4.3

Funk Island provenance

The Leeds material matches the collection of the Yorkshire Museum in condition, colour and size. This strongly suggests that the Leeds bones are also from Funk Island. Burness and Montevecchi (1992) found that Great Auk bones from Funk Island in the Low Arctic oceanographic region are larger than those from Boreal oceanographic regions. However, because of the minute variations between the two Great Auk populations, and the reliance on the individual measuring them, it would not be possible to use such measurements to form a conclusive argument here. Whilst not statistically significant, the Leeds material's similarity in size to the Yorkshire Museum bones does suggest that they are at least from the Low Arctic oceanographic region.

It is tempting to suggest that the Leeds bones also came from the Edward Gerrard collections. Gerrard's would not have been reluctant to sell them at the right price and their collection sounds relatively extensive: "Some beaks, leg bones, &c., that belong to Professor Milne's find at Funk Island..." (Grieve, 1885, p. 84). Professor John Milne visited Funk Island in 1874 (Grieve, 1885). If the Leeds material does originate from Gerrard's then it was probably not bought directly by the museum as such a purchase would have been recorded. The museum certainly bought material from Gerrard's and these transactions appear to be well documented.

There is plenty of further evidence to suggest that the Great Auk bones in Leeds are from Funk Island. Funk Island is famous for its Great Auk bones, it was a principle nesting ground of the Great Auk and, as such, a principle stalking ground for hunters of the bird. The Auks were slaughtered and the bodies rendered for oil on the island with the corpses being then discarded on site. The numbers of bones found on Funk Island were huge: "The existence of the garefowl on Funk Island was discovered about 1534, when the birds were so numerous as to be reckoned, it is said, by thousands." (Lydekker *et al.*, 1911)

Milne writes of his expedition to Funk Island: "Having a strong wish to secure some relics of this bird, and my time for their discovery being limited to less than an hour, it was with considerable excitement that I rushed from point to point and overturned the turf. At nearly every trial bones were found, but there was nothing that could be identified as ever having belonged to the bird for which I searched. At the eleventh hour the tide turned, and in a grassy hollow, between two huge boulders, on the lifting of the first sod I recognised the alcine beak. That rare element called luck was in operation. In less than half an hour specimens, indicating the pre-existence of a least fifty of these birds, were exhumed. The bones were found only from one to two feet below the surface, and in places even projected through the soil into the underground habitations of the puffins. With the exception of one small tibia, and two or three tips of long thin beaks, probably those of the tern, all the bones were those of the Great Auk..." (Milne, 1874). Grieve writes of this Funk Island material entering UK museum collections: "Professor J. Milne, during his visit to Funk Island in 1874, obtained remains that have belonged to about fifty Great Auks, and these bones are now scattered among museums and private collections" (Grieve, 1885).

Richard Owen chose to use a Funk Island mummy for his 1865 description of the Great Auk's skeleton. The bird was supplied to him by the Bishop of Newfoundland (Owen, 1865). One box of bones, an overlooked leftover from a previous Funk Island expedition in a store at the Smithsonian in Washington DC, contained: "...156 carpometacarpi, 148 ulnae, 99 humeri, 126 coracoids, 124 femora, 123 tibiotarsi, and 150 tarsometatarsi, as well as many cranial elements and an abundance of all the lesser parts of the skeleton." (Olson *et al.*, 1979). This is further evidence of the sheer amount of material being shipped out from this small island. The last word must go to Fuller: "Great Auk skeletons – complete or almost so – are by no means as rare as might be expected. Many museums have them. This comparative lack of scarcity is made additionally curious by the fact that almost all come from just one source: Funk Island" (Fuller, 1999).

The Great Auk bones held by Manchester Museum were obtained from Francis Nicholson[5] (Henry McGhie, pers. comm.) and are of a different colour to the material in Leeds and York. It is possible that this is the result of diligent cleaning but they may originate from a different site.

Conclusion

Great Auk bones have been found across the northern Atlantic from Florida (Hay, 1902) to the Bay of Biscay (Elorza & Sanchez Marcho, 1993) and Jersey in the Channel Islands (Andrews, 1920). Relatively locally an upper mandible is also known from South Shields, Tyne and Wear (Fuller, 1999). Greenway (1967) also thoroughly documented the ocean-wide extent of Great Auk finds. There is, however, a large weight of evidence that points to the Leeds material originating on Funk Island. The colour and size of the bones and the prevalence of Funk Island material in museums in general, strongly suggests that the Leeds osteology has its origins there.

Whilst thousands of Great Auk bones have been found over the years since 1844, even today these extinct birds excite interest. Regionally, the Leeds collection appears to be of a reputable size but clearly is not in the league of institutions such as the Smithsonian. It is wonderful to have found Great Auk material in Leeds as it provides the city with a very real connection to these enigmatic birds.

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[5] A Manchester-based member of the British Ornithologists' Union, American Ornithologists' Union and Fellow of the Zoological Society. 1843-1902.

The bones are stored at Leeds Museum Discovery Centre and can be viewed by appointment with the curator.

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The spread of butterflies in Leeds

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As a boy growing up in Leeds in the 1930s and 40s I was aware of butterflies in the garden, although I did nothing to seek them out. All those that I saw were white as far as I can remember, and even in the 1950s I was surprised when a naturalist friend told me that he had seen a 'coloured' butterfly in his garden – probably a reference to a Small Tortoiseshell. I have no information about what could be seen in the countryside on the outskirts of Leeds, but there is no doubt that several species that are present today would have been absent.

It is clear that in the 1930s, 1940s and perhaps even the 1950s, Leeds had a very depauperate butterfly fauna, indeed it is possible that over large areas of the city there were few, if any, breeding species. The area of the city then was of course much smaller before the re-organisation of local government in 1974, when several largely rural areas were taken into the city. The decline in butterflies in the Huddersfield area in the 19th century was the subject of a paper by Fryer and Lucas (2001) who reached the conclusion that the local extinction of some species was caused by the effects of industrial air pollution. Although 19th and early 20th century records for Leeds are less comprehensive than those for Huddersfield, industrial air pollution would be on a similar scale and it is reasonable to assume that it would produce similar local extinctions of butterfly species.

Recording the changes

I became the Lepidoptera Recorder for Leeds Naturalists' Club in the spring of 1992, just in time to record the colonisation of Leeds in that year by two species; the Holly Blue and the Comma. A survey of butterflies in Leeds was begun based on records provided mainly by members of the Leeds Urban Wildlife Group and the Leeds Naturalists' Club. Since 1992 the distribution of butterflies in the city has continued to change, with several new species arriving.

Those species that colonised Leeds from the east faced considerable areas of unfavourable habitat in the built-up area as they continued their range expansion to the west. Some movement no doubt occurred along both the Wharfe and Aire valleys, e.g., some early records came from Harewood Park, and use was made of a small site between the City Station and the River Aire (at one time known as the City Centre Ecology Park). Areas of habitat at Beckett Street Cemetery and Killingbeck were important staging posts in largely urban areas, with early colonies being established at both sites. Other, more mobile species, not restricted to particular colonies, were able to colonise the city area much more quickly.

Reasons for expansion

It is widely accepted that some butterflies have expanded their range northwards and into Yorkshire as a result of climate change. For instance, Menendez and Thomas write that "In the last 40 years, British summers have warmed by about 1.5°C, and butterflies have responded by moving north.....Yorkshire has seen the arrival, or expansion of at least 12 southerly distributed species" (Menendez & Thomas, 2004/5).

Whilst there is no doubt much truth in this view, it does not necessarily account for all the changes in butterfly distribution that we see today. For a large part of the last century, the Gatekeeper, Ringlet, Speckled Wood, and Small Skipper were absent from West Yorkshire, but populations continued in the east of the county. (It is possible that a few small colonies of

Speckled Wood persisted in eastern parts of West Yorkshire). Reports published by the Yorkshire Naturalists' Union (YNU, 1970; Jackson, 1983; Sutton & Beaumont, 1989) record the gradual spread of these species from the east, rather than from the south, the expansion beginning in the 1970s before much concern had been expressed about climate change or 'global warming'.

In their 2001 paper Fryer and Lucas published a comprehensive review of population changes in butterfly populations in the Huddersfield area, which pointed to a loss of species caused primarily by industrial air pollution. The return of these species can be seen as a result of improved air quality following the passing of clean air legislation in 1955 and 1968.

As for the other species mentioned by Menendez and Thomas: the Comma has been expanding its range since 1914, but it does seem highly probable that a warming climate has enabled it to consolidate its position in Yorkshire; the arrival of the Marbled White is somewhat mysterious and subject to some controversy, whilst evidence of the Large Skipper's absence and return to Leeds is hard to find. The complexity of the factors affecting butterfly expansion is shown by their discussion of the Brown Argus whose arrival in Leeds is the result of a changing climate, and also of a genetic change in the butterfly that has enabled it to use different, and more readily available foodplants.

Some species accounts

Small Skipper *Thymelicus sylvestris*

Porritt, recording in the later 19th and early 20th centuries (Frost *et al.*, 2010), said the Small Skipper was fairly common but cited only Bramham from our area. In 1970 the YNU reported, "Apparently absent from most parts of the county, but occurring commonly, though locally, in the eastern half (VC61). Often in abundance at Strensall and adjacent areas (VC62)". Between 1975 and 1980 (Jackson, 1983) the species had spread to sites near Harrogate, Tadcaster, Wakefield, Fairburn and Huddersfield and in 1989 Sutton and Beaumont were able to report a range expansion since the early 1970s and that it was "now widespread and locally common". It is likely, therefore, that during much of the past century the Small Skipper was absent from Leeds; when it arrived (or returned) is not known with any certainty, but it was present in the early 1980s in several areas when I began taking more interest in butterfly distribution. It seems likely that its return to Leeds began during the 1970s. Barnham and Foggitt (1987) date its return to the Harrogate District from the mid 1960s.

It is now present right across Leeds in unmanaged grassland, although it is likely that colonies will have been lost or reduced in numbers with the development of brownfield sites where, on some sites it occurred in large numbers, and increasing management of grasslands. In our survey the Small Skipper has been reported from 128 sites (of which 10 were gardens) in 105 x 1 km squares.

Large Skipper *Ochlodes faunus*

Apart from Porritt's records at Bramham and Ledstone (Frost *et al.*, 2010) there are no historical records to show whether the Large Skipper was present in, or absent from, the Leeds area during the first half of the last century. It was certainly missing from some areas in the West Riding (Fryer & Lucas, 2001) and the YNU report (1970) states, "In recent years it has been observed commonly in some industrial areas where it was formerly absent". In 1989 Sutton & Beaumont wrote that it was "..common generally except on the high land in all five vice-counties". The Large Skipper is listed by Menendez and Thomas as one of the "12 southerly distributed butterfly species" to have "arrived or expanded their ranges in Yorkshire".

Brimstone *Gonepteryx rhamni*
The Brimstone is at present restricted as a breeding species to the south and east of Leeds, although wandering males are often seen away from this area. Porritt found it "of general occurrence (except in the coal districts of the West Riding where it is rare)". There are then no records for VC64 until Sutton and Beaumont recorded a spread beginning in 1982 which produced records in vice-counties 61 to 64 – although no sites in Leeds are mentioned. When this species reached Leeds is not known, but throughout the last 20 years it has been recorded annually in south-east Leeds, presumably its distribution limited by the availability of its foodplants; Buckthorn (scarce on Magnesian Limestone) and Alder Buckthorn

Orange Tip *Anthocharis cardamines*
Porritt found the Orange Tip to be "Generally common throughout the county, but less so in parts of the West Riding". The YNU 1970 report also found that "it may be regarded as generally common, but less so in the industrial parts of the West Riding". Jackson (1983) records an increase in numbers in 1974 when butterflies were noted plentifully near Castleford. In Leeds it was noted as "common in 1978". I first saw Orange Tips in Leeds in about 1975 when they were fairly common in those parts of Wharfedale within the Leeds boundary, and from there they quickly spread across the city. This species is a great wanderer rather than breeding in fixed colonies, and this trait might be responsible for its rapid spread around Leeds.

Purple Hairstreak *Neozephyrus quercus*
The Purple Hairstreak spends most of its life in the tree-tops and is, therefore, very difficult to see, so making statements about its presence or absence can be fraught with difficulty. Even so, there is little reason to doubt that it really was extinct in Leeds for the greater part of the last century. Porritt recorded this species (Frost *et al.*, 2010) from Bramham and Leeds, and there were then no other records until the report in 1992 of a colony in Harewood Park, which came as something of a surprise, as Jackson (1983) had noted that Strensall Common held the only known Yorkshire colony, and that there had been no records from any other site for twenty years.

Since 1992 Purple Hairstreaks have been seen at several sites across Leeds: Middleton Park, Woodkirk Country Club (in 1997), Leventhorpe, Fairburn Ings and Temple Newsam in south Leeds, and Woodside Quarry, Horsforth, West Park (all in 2004), and near Five Lane Ends, Adel/Eccup (2009) in the north. There is nothing to show from which direction the colonisation (or re-colonisation) came and the dates when the butterflies were first noticed do not necessarily indicate when the sites were colonised or the order in which they were established.

White-letter Hairstreak *Satyrium w-album*
The White-letter Hairstreak is probably our least known butterfly. Historical records are few, and recent observations are restricted to very few sites. There appears to have been an increase in this species in Yorkshire in the 1970s, at which time our only known colony flourished in Headingley, although there were other records from Bramham, Hetchell Wood and Parlington. Following the outbreak of Dutch elm disease there was a general reduction across the county, although numbers have increased with the re-growth of elms. The butterfly has been seen at Meanwood Grove, Golden Acre Park and the Otley Wetland Nature Reserve. Some other sites have been identified by Martin Greenland, searching for eggs during the winter months.

Brown Argus *Aricia agestis*
The Northern Brown Argus (*Aricia artaxerxes x agestis*) has been known from North Yorkshire for many years but the butterflies that have been recorded in recent years in Leeds have come from expanding Brown Argus (*Aricia agestis*) populations to the south. First recorded in West Yorkshire at Fairburn Ings in 2000 the Brown Argus later appeared at Ledsham Dale, where a small population has survived for some time. This expansion has been made possible by the species changing its foodplant from Rock Rose to Dove's-foot Cranesbill and Common Storksbill (Menendez & Thomas, 2004/5). Ironically neither of these plants is present at Ledsham Dale, but Rock Rose is plentiful. Because of the restricted range of its food-plant(s) the Brown Argus is unlikely to spread to sites off the Magnesian Limestone. The population at Ledsham appears to very small, and none were reported in 2010.

Holly Blue *Celastrina argiolus*
Although it appears that there were a few Holly Blues in the south-east of Leeds in 1991, the species suddenly became common and widespread in Leeds in the following year. This was unexpected as there is no evidence to suggest that it has ever been present in Leeds before 1992. The only known Yorkshire colonies had been near York and in the Pateley Bridge district from about 1978. The Nidderdale colony had been, unusually, single brooded, with only one generation per year; the recent colonists in Leeds have the normal two generations.

After its sudden arrival here, the Holly Blue suffered a change of fortunes from 1994 to 1997 when numbers were very low and very few records were received. Holly Blues were reported from 24 sites in 1992, 18 in 1993, but only 2 in 1994. 1998 was however, a good year with numbers approaching those of 1992, with rather fewer sightings in 1999. The present population is small, but apparently more or less stable. It readily enters gardens, and there have been garden records of egg-laying and of caterpillars. The colonisation of West Yorkshire in 1991/2 appears not to have been due to the expansion of existing colonies, but to be the result of large-scale immigration, with many records of butterflies flying in off the sea to the Yorkshire coast. It is not known whether these immigrants were from continental Europe or the result of a coastal movement from the Norfolk side of the Wash. The first Leeds record is of one at Fairburn Ings NR on 10 July 1990.

Comma *Polygonia c-album*
The first Comma reported in Leeds in modern times was seen in a Cookridge garden in August 1991 (D.J. Simpson pers.comm.). There must have been others around at that time because many were seen in spring 1992 and the species quickly became well-distributed over Leeds, adults being noted in 22 x 1Km squares from all parts of the city area by the end of autumn 1992. Porritt (Frost *et al.*, 2010) states that the Comma had occurred at Adel Blackmoor, but there are no other known records of this species from Yorkshire between 1879 and 1895. After a national decline the Comma was restricted to Gloucestershire, Hereford and Monmouth from where it began an expansion in about 1914 which brought occasional individuals to Yorkshire in the 1940s. The current expansion began in the 1980s (Frost, 2005). Whilst several colonial species that returned to Leeds from the east took several years to cross to the west of the city, the Comma, not being restricted to fixed colonies, managed to spread quickly across the whole area in one year.

Speckled Wood *Pararge aegeria*
The Speckled Wood is typically seen flying through the dappled sunlight of a wood, or perching on a sunlit leaf. It appears to have been resident in different parts of our area for many years, but absent from some areas from time to time. Porritt (Frost *et al.*, 2010) reported the species from Bramham and Ledsham; YNU (1970) thought that it was widely distributed in

the south and east of the county and that it was particularly attached to the Magnesian Limestone ridge, with Barwick-in-Elmet (1957) the only Leeds site mentioned. Jackson (1983) found that the butterfly was missing from some of its former localities, but that it "continues to occur commonly in woods near Fairburn and Micklefield". David Smith (pers. comm.) says that it was common at Hetchell Wood in the 1950s.

Colonisation (or re-colonisation) of the Leeds area seems to have begun in the late 1980s; the Castleford Naturalists' Society reported that in 1990 it had been recorded from Newthorpe Quarry, the Ledsham area, and Billy Wood (Kippax) where it had been seen in 1989. In the early and mid- 1990s I found that it was present in all the woodland areas on the Magnesian Limestone that I visited, but was apparently restricted to this habitat, although there was no obvious reason for it to be confined to limestone areas, as its subsequent expansion proves.

The first record west of the limestone ridge was a single at Arthington Hall in 1997, followed by the discovery of a colony at Killingbeck and a single at Middleton Park in 1999 and then by others in a Headingley garden in 2000 and a Carr Manor garden in 2001. In 2002 the species was reported from five new sites, including a colony at Beckett Street Cemetery; there were eight west Leeds sites in 2003 and 16 in 2004. The new colonies found in 2004 include one on the extreme west of Leeds at the Otley Wetlands Nature Reserve.

In 2005 and 2006, particularly in late summer and autumn, the Speckled Wood began to be seen at sites all over the western side of Leeds attracting lots of attention from people finding it in their gardens for the first time. It is now the most frequently recorded butterfly in Leeds and the ease and the speed with which it has established itself in the west of the city makes one wonder why it took so much longer than other species to increase its range.

Marbled White *Melanargia galathea*
Marbled White butterflies have been seen in Leeds on several occasions since the first was recorded in 1983 at Hook Moor on an embankment of the A1 (S. Joul pers. comm.). The first indication of the establishment of a colony in Leeds was in July 2006 when about 20 were counted at Madbanks, part of the Ledsham Banks SSSI. In the intervening years Marbled Whites had been seen at several sites, all close to the A1:

Fairburn Ings	1996, 1998, 2003	Hetchell Wood	1999, 2000
Barwick	1998	Leventhorpe Ash pond	1999
Bramham Park	1999, 2000	Madbanks	2004, 2005

Several records from the Harrogate district, all within 4km of the A1, are listed by Barnham *et al* (1993). There are no historical references for this species in Leeds except for a record published in 1853 of one taken at Bramham Park "many years ago".

It has been suggested that the colony at Madbanks is the result of deliberate introduction, but no evidence for this has been produced. The pattern of occurrences listed above could equally well indicate expansion of range by natural or accidental means. (Brockadale Nature Reserve, which has a healthy colony of this species, is close to the A1 and is a possible source for butterflies to be swept along by road traffic). The colony has been observed each year since 2006 and there have been reports of Marbled Whites seen at other sites in the area. According to Thomas and Lewington (2010) the Marbled White is capable of living on a variety of soils in the south-west; away from that area it is restricted to calcareous habitats, and it seems likely therefore that any future expansion in Leeds will be confined to areas on the Magnesian Limestone.

Gatekeeper *Pyronia tithonus*
In 1992 when our survey started, Gatekeeper, Ringlet and Speckled Wood were recent arrivals in east Leeds and the Gatekeeper was the first to make progress across the city to establish colonies in the west. Although a relatively new resident in Leeds, it is now well distributed over the whole of the area. It has been recorded from 112 1km squares, from both suburban and rural sites. In particularly favoured areas numbers can be very high. It is occasionally reported from suburban gardens.

In the 19th century it was said to be very common on the east coast, less common elsewhere, but reported by Porritt from Hunslet, Thorner and Methley in our area (Frost *et al.* 2010). For most of the 20th century the species appears to have been confined to East Yorkshire and, although there was some range expansion during the 1970s (Jackson 1983) there were no subsequent West Yorkshire records until one was seen in Wetherby (presumably within the Leeds boundary) in July 1983. Colonisation of Leeds appears to have begun sometime during the 1980s and by 1992 the butterfly was well established in east Leeds. Sightings west of the city centre began in 1994 with singles at Moor Grange and Golden Acre Park and further expansion was seen in 1995 and 1996 (Adel Dam NR, Parkway Hotel, Harewood area). Now found in most suitable localities, it has reached the extreme west of the area at the west end of Otley Chevin, (first seen 2001) and the Otley Wetlands NR (2003). Although being the first to make the leap across the City, the Gatekeeper now appears to be present in smaller numbers than the Ringlet and the Speckled Wood.

Ringlet *Aphantopus hyperantus*
Like the Gatekeeper, the Ringlet seems to have arrived in Leeds from East Yorkshire, where it was said to have always been common and, after a few years, to have continued its expansion across the city to areas of habitat on the west. Porritt (Frost *et al.*, 2010) reported the Ringlet from Ledsham and Bramham in our area but it then appears to have become extinct in West Yorkshire. In 1970 it was found to be widely distributed and common in East Yorkshire but absent from the whole of the West Riding except the extreme south east (YNU 1970). There was a dramatic expansion of range in the 1970s with colonies established around Selby, and near Ripon, Thirsk and Leyburn. Colonisation of other parts of the Harrogate area began in 1984, and the species probably reached Leeds in the late 1980s.

The Ringlet began to spread across Leeds some years after the Gatekeeper, first colonising several sites in the Wharfe valley in 1996 with the first record west of the city centre coming from a garden in Burley (D Fawcett pers. comm.) in 1997. Since then it has spread across the whole of the city wherever there are suitable sites, reaching Yorkgate Quarry (2001) and Otley Wetlands Nature Reserve in the extreme west of Leeds by 2003.

Possible future changes
Not all the changes in butterfly distribution are the result of recent colonisation. When our survey began the Wall was a common species, widely distributed across Leeds and reported from 117 sites over the past 20 years. Recently population numbers have plummeted and none were reported in 2010. This decline appears to be part of a trend that began in the south of the country.

The Common Blue is another species that is perhaps in some difficulty. Some very large populations have arisen on former industrial sites where restoration has produced extensive areas of Bird's Foot Trefoil, for example, at Fairburn Ings NR and Rothwell Country Park. Elsewhere, in more natural areas, populations are in decline, or have already disappeared, apparently because, as sites mature, they become in some way unsuitable for the butterfly.

Continuing climate change might allow some species to expand their ranges in this country, but it could also bring exotic diseases and pests which could have adverse effects.

There must be more species of butterfly breeding in Leeds now than at any time in the past 100 years and there are other species that may be able to colonise the area, particularly if the trend for warmer summers continues. Most likely perhaps is the Essex Skipper which has already been recorded in Yorkshire, although it does not appear to have established itself in the county. Another possible is the White Admiral which recolonised Lincolnshire about 60 years ago (Thomas & Lewington, 2010) and odd ones have been seen in adjacent areas of East Yorkshire.

However, as Menendez and Thomas (2004/5) point out, butterflies with specialised habitat requirements which were once present in Yorkshire "went extinct as a result of the loss, fragmentation and changed management of their habitat....and they will probably never recolonise Yorkshire unless major habitat restoration and conservation programmes are initiated".

It is unlikely that the distribution of butterflies will be settled for very long, and recording their changing fortunes will continue to be a rewarding and fascinating occupation in which the amateur can still make a contribution.

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Working on the Leeds Museum Ichneumon collection

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Ichneumons are not popular insects, even with entomologists, and the majority of specimens which find their way into museum collections are minor components of collections which feature other groups more prominently. Collections in which ichneumons are the major interest are comparatively scarce. The specimens at the Leeds Museum Discovery Centre are typical in this respect. What is not typical is the large collection of (presumably duplicate) specimens transferred to Leeds from the Manchester Museum during the 1950s.

When I took over as the Union's Parasitic Hymenoptera Recorder in the early 1980s I visited several museums to find out what specimens they held so that I could add the details to the YNU record cards. I made a note of the ones which had been named and I borrowed others where I thought I could identify them. Since I retired in 2009 I have the time to go back to these collections and check them out more thoroughly. More importantly, that time is available during the week when museum staff are at work. I had noted on the YNU cards which museum collections held each specimen. So, once I had transferred all the records to a word processor, it was comparatively easy to assemble a list of specimens which the YNU records indicated were at a particular museum, such as the Leeds Museum Discovery Centre.

The work I planned to do at Leeds was to:

a) check the identifications of the small number of insects which I had previously identified but where taxonomic advances had resulted in species splits. These were members of the subfamily Pimplinae, for which a Royal Entomological Society Handbook was published twenty years ago (Fitton *et al* 1988). Recent research was summarised in Shaw (2006) with additional species in *Scambus, Pimpla* and *Acrodactyla,* amongst others. Some of these 'new' species are quite common.

b) check the identifications of specimens where I was not confident that they had been named correctly. I have previously mentioned (Ely, 2010) the problems caused by Claude Morley's identifications and there were a few of these in the Leeds collection. Almost all of them were incorrectly named. I am always hesitant either to accept or to question identifications from earlier generations of hymenopterists. On the one hand, these guys were probably better at this than I am but on the other there have been huge advances in knowledge in recent years. The 1978 checklist of British Hymenoptera listed c.2,000 species of ichneumons while the latest version has over 2,500; that is a 25% increase in 30 years and many of the additions have been described as new to science in that period. Even insects which were 'correctly' identified half a century ago need to be re-assessed in the light of current knowledge. One entomologist I was unsure about was Harry Britten, who had named many of the insects in the Manchester Museum collection, including some of those transferred to Leeds. From a study of the Leeds specimens I found that his identifications were over 90% correct on current interpretations but there were sufficient numbers that required correction that I feel justified in continuing to regard his records as unconfirmed until I can check them. A big job awaits me in Manchester!

c) identify any other specimens which had not been named.

These tasks would allow me to upgrade and improve the YNU records.

In addition, when I prepared the list of Yorkshire specimens in the Leeds Museum collection it became very clear that there were many gaps. Some of these I was able to fill as I identified specimens that I had collected or which other naturalists had passed to me for identification.

The ex-Manchester Museum specimens were the only ones at Leeds which were identified and arranged in taxonomic sequence. The natural history curators, Clare Brown and Joe Botting, looked through the insect collections and found ichneumons in several other drawers. Some of them I had seen and identified already - those collected by Adrian Norris and John Flint plus some of my own duplicates - but others kept emerging as they worked through the collection. The only other substantial collection of Parasitica was collected during the 1960s as part of E. Broadhead's researches at Leeds University into psocids, with Parasitica specimens from four sites around Yorkshire. Broadhead did not put his name on the specimens so I suspected many of them had really been collected by students but all the insects are mounted in a consistent manner and labelled by the same hand. Broadhead gets the credit for them. Only a couple of specimens had been identified from this collection and one of them was new to Yorkshire.

There is an argument for keeping the specimens collected by one individual separate from those collected by others, particularly if that individual has made a significant contribution to our knowledge. The alternative is to combine specimens of the same taxonomic group into a reference collection. The former emphasises the social context of a collection while the latter improves the scientific usefulness and is the way that, for example, the collections at Manchester and the Natural History Museum in London are organised. The ex-Manchester Museum specimens at Leeds mainly comprised those collected by Douglas Hincks, Harry Britten and John Wood, so the precedent had been set for a taxonomic system. The curators at Leeds agreed that the other specimens would be incorporated into this base and the way to segregate the Broadhead and Flint specimens is by assigning them an accession number and adding this to the individual specimens.

The addition of all these extra specimens meant that the ichneumon collection had to be re-organised and the decision was taken to move them into new (or at least recycled) drawers. Many of the names on the ex-Manchester Museum specimens were now out of date, so I prepared a series of label lists from the on-line checklist so that users of the collection would be able to relate the specimens to their current names.

A few surprises cropped up in the previously unidentified material. A specimen of *Townesia tenuiventris* (Holmgren 1860) was from a Leeds garden in August 1950 and the only other record is from a wood near York where Sally Fraser collected it during the York University survey in 2003. Has it really been hiding from us for half a century? There were four specimens of *Polyblastus tener* Habermehl, 1909 and ten specimens of *Polyblastus westringi* Holmgren, 1855 in the Broadhead collection. These were not new to Yorkshire but they greatly outnumbered the previous records, added a new vice-county for each species and allowed me to associate the rather differently marked sexes of these Tryphonines. Leeds Museum now has as many specimens of *Polyblastus westringi* as the Natural History Museum, whose specimens are mainly from Scotland.

When the specimens had been checked or identified and placed in the collection, I was able to update the list for the Yorkshire ichneumons at the Leeds Museum Discovery Centre and send Clare an electronic catalogue. I did no serious work on the non-Yorkshire specimens, of which there are plenty in the ex-Manchester Museum material. Cheshire, Lancashire, Westmorland and Staffordshire feature prominently with smaller amounts from Derbyshire and Hampshire. I incorporated them as they stood but there is work for someone else in the future to bring them up to the same standard as the Yorkshire specimens.

Summary
This work at Leeds has all been carried out under the supervision of the museum curators. Natural history curators are often very knowledgeable about the material in their care but they have 101 jobs to do and, like the rest of us, only one pair of hands to do them. If you have an area of knowledge which is relevant to a museum's collections and the time to devote to working on them, contact the curator in your nearest museum and offer to help. You will probably receive a warm reception. The tasks I carried out with Clare and Joe were:

a) collecting the specimens together
b) checking identifications where necessary
c) identifying previously unnamed specimens
d) attaching accession numbers
e) arranging the collection in taxonomic sequence
f) labelling the collection
g) producing a catalogue

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Book review

The Royal Horticultural Society Birdwatcher's Notebook. Pp. 144, incl. numerous colour plates. Frances Lincoln. 2010. £7.65 paperback.

This pocket-sized, flexibound notebook is a useful companion for any birdwatcher. As well as offering ample space for recording, the notebook also includes useful bird identification information and an undated Year Planner for birdwatching trips and outings. Although the pages are predominantly blank, they are interspersed with colour photographs of unidentified birds with the reader being directed to another page for the correct identifications.

As a youngster, my mentors always encouraged me to carry a notebook, something that has set me in good stead for over 45 years. However, amongst today's birdwatching fraternity, notebooks appear to be rarely used. Although rather expensive, if this publication stimulates birdwatchers to carry (and use!) a notebook, it will have achieved some success in ensuring that field data are written in the field and not from retrospective memory.

MLD

The creation and development of a wetland nature reserve

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Rodley Nature Reserve nestles in a bend of the River Aire less than five miles from the centre of Leeds. Situated as it is on a flood plain, the reserve is very much influenced by the river. Once heavily polluted by industry, the River Aire is much cleaner than it was a few years ago. In 2007 the Environment Agency introduced 60,000 Elvers on the reserve stretch of the river and, more recently, the river was restocked with Roach, Dace and Barbel. A few Salmon and Sea Trout try to ascend the river each year and Brown Trout grow to a good size here. Kingfishers are numerous, hunting the shallower areas for Minnows and other small fry and Otters are regular visitors these days.

Despite its proximity to Leeds, the reserve is a very peaceful place. Visitors often remark on this fact despite it being surrounded by built-up areas on both sides of the valley. It is also rather unique in that the wetlands were dug from scratch. The reserve is operated by Rodley Nature Reserve Trust Ltd who lease the land from Yorkshire Water plc.

Less than 12 years ago the reserve site was just an area of grassland at an old sewage treatment works. The origins of the reserve date from 1992 when Yorkshire Water plc announced their intention to decommission their Rodley works, a gravity-fed field treatment system. Prior to decommissioning, the Leeds environmental group 'Eye on the Aire' investigated with Yorkshire Water the opportunities for creating a wetland nature reserve on the site. Representatives from the various local wildlife groups became involved, feasibility studies were carried out and years of meetings took place before Rodley Nature Reserve Trust Ltd was formed in August 1997 to run the proposed reserve. However, it was to be almost another two years before work started on creating the wetlands.

Together with Land Wood and Water Co Ltd, a company specialising in environmental restoration and enhancement projects, the Wildlife and Wetlands Trust Wetlands Advisory Service was commissioned to review the design for the reserve and ensure that the conservation objectives of the proposed reserve could be met. Full planning permission was received from Leeds City Council in April 1999, and 14th May 1999 marked a significant milestone as work at last started on digging out the main two hectare lagoon. The earthworks required at Rodley were to be achieved by the reforming of the land profiles without the need to import or export material from the site. Utilising on-site material would ensure that the project was both cost effective and environmentally beneficial, minimising traffic movement in and out of the site. Surplus soil material would be spread over a sunken field known as the Snipe Meadow and this in time would become the 'Farming for Birds' crop field.

Having obtained an Abstraction Licence from the Environment Agency, water for the wetlands would be supplied from the River Aire by means of two small tower-based wind pumps. Wind power was regarded as the most environmentally sustainable approach to getting water onto the site, with little visual impact, low noise impact, no pollution and, in theory, low maintenance costs.

The second wetland area in the chain would be the duck marsh, designed to be a shallow water body providing ideal feeding conditions for migrant wading birds and dabbling ducks. Water would be discharged from the lagoon by gravity via a fixed level outlet to the duck

marsh with a facility to reduce the water level on the lagoon, if necessary, via a simple sluice gate arrangement consisting of a series of boards which could be individually removed to achieve the level required. Water would then discharge from the sluice onto the duck marsh. The level of water on the duck marsh itself could be controlled by an adjustable outlet pipe which could be raised or lowered to give the required depth.

Water would discharge from this adjustable outlet onto the third wetland area, the reed bed, planting of which would start later that same year. From here water would be released via a similar outlet system to the fourth and final part of the wetland system, the wet grassland. This would consist of a network of flooded ditches which would retain water throughout the year. In winter the whole area of wet grassland would be flooded to provide a feeding and roosting site for wintering wildfowl. Water levels on the wet grassland would be controlled via another simple sluice gate arrangement enabling water to be gravity-fed back into the River Aire.

Heavy earth-moving work was largely completed by July 1999 and September saw the completion of the wetland areas. Three metal containers were lowered into place by the lagoon, the duck marsh and between the reed bed and wet grassland, and these were converted and fitted out as bird-watching hides.

Guided walks for the public were held on 2nd October 1999 and on 28th July 2000 the reserve was officially opened by the Rt. Hon. Michael Meacher MP, Minister for the Environment. The Friends of Rodley Nature Reserve was set up later that year to co-ordinate the efforts of volunteers and raise funds for the running of the reserve. A further important development that year was the reserve's admittance to the Countryside Stewardship Scheme on 1st October.

Maintaining the right amount of water on the wetlands was to be a problem for some years. In 2000 there was initially too little and later far too much water with continuous heavy rain resulting in considerable flooding. It also became evident that the lagoon was losing water rapidly and this was eventually tracked down to a number of deeply buried drains. At the beginning and end of the year the vanes of both wind pumps sheared off due to very strong winds and were out of action for some time. Resorting to a diesel pump to maintain levels on the lagoon prompted complaints about the noise from local residents.

Despite the problems in maintaining water levels, Mallard, Coot and Moorhen all bred on the lagoon for the first time in 2000, and on 26th August 2001 a Red Phalarope was the first of several 'twitches' on the reserve. While Common Terns visited annually from 2000, it wasn't until 2006 that a pair nested successfully for the first time. Ninety-seven species were recorded in that first full year.

Strong westerly winds funnel down the Aire Valley and these were to be a constant problem for the vanes on the wind pumps Eventually, in 2008 following significant gale damage, the wind pumps were dismantled and replaced by electric pumps. Whilst water leakage is now no longer a significant problem, high river levels frequently block the water inlet from the river with debris, resulting in no water being available to pump from the wells.

Two of the original metal hides are still in use to this day. In 2007 a wooden hide was built on the willow path overlooking the duck marsh and in the same year a wheelchair-friendly ramp and hide were constructed looking onto the wet grassland. Conscious of the need to improve the facilities for wheelchair users, in 2009 a solid, permeable path was constructed from the entry road to a ramp and new hide overlooking the lagoon. However, in September 2009 two hides overlooking the duck marsh were burnt down in an isolated act of vandalism.

Fortunately, friends and supporters rallied round and thanks to their many generous donations and the support of Natural England two purpose-built steel hides were obtained and these were installed early in 2010. Both new hides have excellent facilities for wheelchair users.

As the wetlands mature, more interesting species are being found. A survey carried out by Bradford Botany Group in 2008 found Orange Foxtail (*Alopecurus aequalis*), Marsh Dock (*Rumex palustris*) and Pink Water-speedwell (*Veronica catenata*), all scarce plants in Yorkshire. Among the many moths recorded on site in recent years several wetland specialists have colonised including Bulrush Wainscot (*Nonagria typhae*), Twin-spotted Wainscot (*Archanara geminipuncta*) and Southern Wainscot (*Mythimna straminea*). In 2009 a Water Stick Insect (*Ranatra linearis*) discovered in one of the ditches on the wet grassland was a particularly interesting find as it is a very recent colonist in Yorkshire.

In 2004 work started on four small ponds to provide further habitat for dragonflies. More recently, several more ponds, a 45 metre ditch and a small marsh area have been added. With winding paths and several seats this has provided a wonderful area for dragonfly enthusiasts and photographers in the summer months. However, the story of these ponds is the subject of a separate article in this issue by Dr Peter Mill (see p147).

As part of the dragonfly project a large rectangular pond was dug to provide pond-dipping facilities for school groups and uniformed organisations. This pond has decking on two sides and was opened for the first time in 2008.

Although it is principally a wetland nature reserve, Rodley also incorporates a willow coppice, two hay meadows, a crop field and around twenty acres of scrubland. In spring the willow coppice is home to several species of migrant birds. Willow Warblers, Blackcaps, Garden Warblers and Common Whitethroats all arrive in April from their wintering grounds in Africa to breed here. Resident breeders include Bullfinch, Song Thrush and Long-tailed Tit. From November volunteers coppice the willow, using the cut branches to build and repair gates and dead hedges on the reserve.

The hay meadows were created around nine years ago and are still very much in their infancy. Strong growing grasses flourished in the early years but the introduction of Yellow Rattle (*Rhinanthus minor)* is now helping to reduce the vigour of the grasses, giving wild flowers the opportunity to become established. Yellow Rattle is a hemi-parasite fixing its roots onto the roots of an adjoining grass and extracting water and minerals from it. The hedgerows surrounding the meadows were planted around the same time and in November 2008 a hedge-laying course was arranged for volunteers with the help and guidance of Natural England. Further sections of hedge were laid in 2009 and 2010.

The 'Farming for Birds' field is used to grow bird-friendly seed crops. A mixture of Quinoa, Kale, Mustard, Triticale, Sunflower and Flax brings in flocks of Linnets, Greenfinches and Goldfinches as the seed heads ripen in late summer and autumn. As the crops grow taller they provide valuable cover for Pheasants and Roe Deer which are common in the valley. When crops are left for a second year a strong growth of Hemlock (*Conium maculatum*) dominates, providing ideal nesting conditions for Common Whitethroats, Reed Buntings and Sedge Warblers. More recently, half of the field has been planted with a pollen and nectar mix, benefiting bumble bees and butterflies.

The eastern end of the reserve consists of 20 acres of rough scrubland by the river with small groups of willows dotted here and there. A riverside path was constructed in 2010 to give

views onto both the scrubland and the river but further major development of the scrubland is not envisaged. The area is a popular nesting site for numerous pairs of Common Whitethroats in the spring and summer months and Grasshopper Warbler can be found here some years. It is also a prime hunting area for the resident pair of Kestrels and potentially for Barn Owls. Goosanders can often be seen on the river in the winter months and Little Grebes and Kingfishers are possible throughout the year.

No visit to the reserve would be complete without a visit to the manager's garden. In days gone by, the manager of the sewage works had a large house here. There is no trace of the house now but the garden area with its old lilac and privet hedges still exists. The garden is enclosed by trees and a hide has been built overlooking the area. Bird feeder stations are sited round the garden and this is a good place to look for the more common garden birds but Grey Partridges also reward the more patient observer as they emerge to feed on spilled seed on the ground. Tree Sparrows, Reed Buntings and Willow Tits are regular visitors to the feeders in the winter months.

Having participated in environmental stewardship under the Countryside Stewardship Scheme since October 2000, in April this year the reserve was admitted to the Higher Level Stewardship Scheme. Not only does this give financial benefits but it also provides valuable advice and guidance from Natural England on the management of the land.

Two buildings on the site were originally used as changing rooms and offices for employees at the sewage works. One of these has been converted into a visitor centre with wildlife displays and there is a small café area manned by volunteers. In wet weather activities for school groups take place in the visitor centre. The garden around the visitor centre has wheelchair-friendly paths and is planted with a mix of herbs and native wild flowers, designed with insects in mind and providing a blaze of colour in the summer months. A light trap is run in the garden in the summer months to attract moths and enable children to appreciate the beauty of these nocturnal insects. A substantial extension was built onto the visitor centre recently and this will be used as an education centre for visiting school groups and older students. The reserve already hosts groups of primary school children throughout the spring and summer months and the activities arranged for them are many and varied. The reserve also provides a valuable learning resource for older children and adults. College students are now regular visitors, many doing their course work here, and guided walks are provided for various groups and societies throughout the year.

Pond-dipping is always a popular pursuit with younger visitors in the summer months. A public dipping pond was dug several years ago close to the visitor centre and last winter a second substantial pond was dug next to it. This will be left to mature in 2011 to enable plants and wildlife to establish. Nets, trays and illustrated charts are provided to all youngsters and all captures are safely returned to the water after identification. It is heartening to see how many of these children subsequently return to the reserve with their parents. Many of the children come from inner city schools and for many it is their first introduction to natural history. Some have never seen a swan before.

Rodley Nature Reserve provides a wonderful free amenity for local people and around 20,000 visitors now come here each year. Organised dragonfly, butterfly and bird walks bring in many families in the summer months. The evening bat walks are particularly popular in the summer when children are provided with bat detectors to identify the different species found on the reserve. In July 2010 a Biodiversity Day was held to celebrate both the International Year of Biodiversity and the tenth anniversary of the official opening of the reserve. Bird-ringing

demonstrations, a small mammal survey, moth-trapping, bug hunts, dragonfly and botany walks were all well attended and the plan is to run similar events each year in the future.

The surprising thing about Rodley is that it is run entirely by volunteers. The Friends of Rodley Nature Reserve raise much needed funds to keep the reserve running. Local companies provide valuable help by sending teams of young people to work on the reserve as part of their team-building days or course work. Managing and maintaining the different habitats is a huge task: in the summer months all the grass paths round the reserve are cut on a weekly basis. Himalayan Balsam (*Impatiens glandulifera*) is rampant all along the river and eliminating it from the reserve takes many weeks of work each year. Clearing Bulrush (*Typha latifolia*) from the ditches on the wet grassland is a labour intensive task which needs doing every autumn to avoid the ditches becoming choked. A section of the reed bed has to be cut every year and excessive vegetation has to be removed on the duck marsh. The three islands on the lagoon also need to be cleared of vegetation each winter in readiness for the return of Oystercatchers and Lapwings to their nest sites in February.

Our flora and fauna are increasingly under pressure as habitat disappears at an alarming rate. It is heartening, therefore, that with a little help from humans, nature is gradually reclaiming an old sewage works that no other use could be found for. The creation of wildlife havens like Rodley becomes increasingly important, not just for the wildlife but for people too.

The Dragonfly Conservation Project at Rodley

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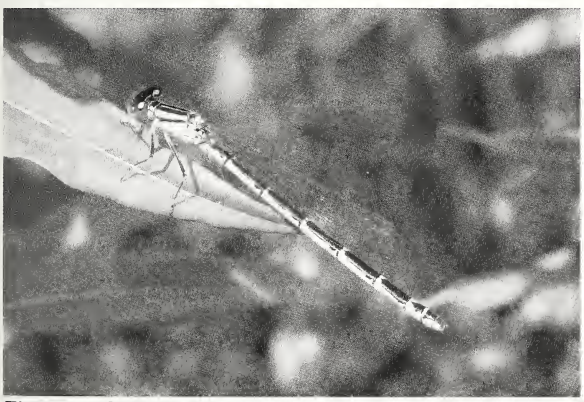

Figure 1: Common blue damselfly, one of 15 species of Odonata observed *J.Bowers*

The Dragonfly Conservation Project at Rodley Nature Reserve (RNR) started in 2003, when I mentioned to the then Chairman, Shirley Carson, that I was a member of the British Dragonfly Society (BDS). She offered me the area of the settling tanks of the former sewage works (see Murphy, this issue p143) to develop for the conservation of dragonflies (Odonata). The aim of the project was to establish a Dragonfly Conservation Area (DCA) and to make it accessible to the public, including the provision of wheelchair access. Thus people would be able to observe at close hand the beauty and fascinating behaviour of these insects. At this point it is worth noting that the term 'dragonflies' includes both dragonflies (Anisoptera) *sensu stricto* and damselflies (Zygoptera) – a quirk of the English language (Fig.1).

The first task was to raise funding since, although there is an excellent team of dedicated volunteers at RNR, a JCB would be needed to carry out the rough structuring of the area. The

ponds would require lining because of the fluctuating water table and soil would have to be imported, both to raise the level of the paths so that they didn't flood in winter and to put in the ponds, owing to the very high organic nature of the soil on site. Pump-priming funding was obtained from the British Dragonfly Society, the Leeds Philosophical & Literary Society and from the funds of RNR itself. This helped in successful applications to Green Leeds and the Community Chest (Leeds). Some funding was also obtained from the closure of the Leeds Urban Wildlife Group and private donations. Finally, the George Martin Trust provided funding for a display board of the likely species of dragonflies that might be seen. In all, around £13,000 was raised, sufficient to establish five ponds (Plate V, Centre pages).

Work commenced in the spring of 2004 and the first two ponds were lined that autumn. Two more were completed by June of the following year and all four were planted out in July 2005. These first four ponds varied a little in size and averaged about 12m x 9m. To maximize the attractiveness to dragonflies, a variety of vegetation is needed; submerged vegetation for the larvae to hide in, floating vegetation to provide oviposition sites for those species that lay their eggs endophytically and emergent vegetation for the final stage larvae to use for their emergence into adults. Only native plants were used and it was decided to plant out each pond differently to increase the range of available habitats (Table 1). Some plants were already present on the reserve but most were bought. A fifth pond (17m x 8m), with decking on two sides, was constructed in July and August 2006. This pond was surrounded by dead hedging using willow from the plantation on the reserve and is restricted to pond-dipping by school and some other groups. It was allowed to become established before it was brought into use in the summer of 2007. It is the only pond in the DCA where pond-dipping, other than for surveying purposes, is allowed.

The general method of construction was to dig a hole and backfill it with a thin layer of sand, on top of which a geotextile (Polyfelt T60 Geotextile) underlay was laid. The liner used on top of this was either 0.75mm Greenseal or 1.00 mm Firestone Pond Liner. Around the edge of each pond a strip of underlay about 1m wide was laid on top of the liner to provide additional protection. The pond was then backfilled with a thin layer of soil and filled with water, pumped in from a ditch in the adjacent wet grassland. This water has been extracted under licence from the River Aire upstream of the reserve and has passed through the lagoon, duck marsh and reed beds to reach the wet grassland (see Murphy, this issue) and hence is well filtered.

Table 1. Plants introduced to the first four ponds

	Emergents	Floating	Submerged
Pond A	Soft Rush (*Juncus effusus)* Common Cotton Grass *(Eriophorum angustifolium),* Water Forget-me-not *(Myosotis scorpioides)*	Broad-leaved Pondweed (*Potamogeton natans)*	Spiked Water-milfoil (*Myriophyllum spicatum)*
Pond B	Flowering Rush (*Butomus umbellatus),* Bogbean *(Menyanthes trifoliata)* Water Mint *(Mentha aquatica)* Lesser Spearwort *(Ranunculus flammula)*	White Water-lily (*Nymphaea alba)*	Curled Pondweed (*Potamogeton crispus)*

	Emergents	Floating	Submerged
Pond C	Arrowhead (*Sagittaria sagittifolia)* Water Figwort (*Scrophularia auriculata)* Unbranched Bur-reed (*Sparganium emersum)* Brooklime (*Veronica beccabunga*)	Fringed Water-lily (*Nymphoides peltata)* Frogbit (*Hydrocharis morsus-ranae)*	Water Violet (*Hottonia palustris)* Soft Hornwort (*Ceratophyllum submersum)* Water Crowfoot (*Ranunculus aquatilis)*
Pond D	Yellow Flag (*Iris pseudacorus)* Amphibious Bistort (*Polygonium amphibium)* Marsh Woundwort (*Stachys palustris)* Soft Rush (*Juncus effusus)*	Yellow Water-lily (*Nuphar lutea)*	Rigid Hornwort (*Ceratophyllum demersum)*

In 2007 we applied for recognition as a BBC 'Breathing Place' and this was granted, which enabled us to apply for Lottery funding of up to £10,000 without the need to match-fund. So, following on from the success of the first phase, a second phase was planned. Again the BDS provided initial funding and further funding was obtained from the Big Lottery Fund (Breathing Places grants programme) and WREN (Waste Recycling Environmental Ltd). The latter requires 11% of its funding level to be provided up front by a third party and Leeds Philosophical & Literary Society and the Friends of Rodley provided this. Accenture provided some funding for maintenance. This phase cost about £37,000, giving an overall total for the whole project of about £50,000. Continuing maintenance funding is provided by the RNR Trust.

In this second phase a further four ponds of varying size were established; also a long (45m) ditch and a marsh area (Centre pages Plate V). The marsh area, measuring 20m x 15m, was the first to be completed, in September 2008. A single liner was used, covered completely with underlay for added protection, and backfilled with soil to leave six areas of open water (Fig.2) interconnected by pipes. A drainpipe with adjustable height enables the water level in the area to be controlled. Later that autumn a pond (6m x 6m) and the long ditch (45m x 3m) were completed (Centre pages Plate VI). The following spring the remaining three ponds were completed. One is quite small (3m x 3m); the other two are 8m x 6m and 14m x 4m respectively. The last of these has a very gentle slope at one end with a pebble beach to provide a basking area for Darter dragonflies. All of these water bodies were planted out in the spring of 2009, when plants became available. Again, different plants were used in the different water bodies. With the exception of the education pond and the ditch, all of the ponds in both phases have gently sloping margins.

All of the water bodies have been interlinked by grass paths (also a bridge over the long ditch) to provide good public access. A considerable amount of soil had to be moved or brought into the reserve to raise the level of the paths to prevent flooding in winter. As noted above, a JCB was hired for some of the heavy work but all the rest has been carried out by the volunteers and occasional visiting parties. Since the water bodies are lined it is necessary to have a source of water in times of drought and thus an irrigation system was designed so that water can be pumped selectively into any pond from the ditch in the adjacent wet grassland. Maintenance is carried out by the volunteers, who spend at least one day a week working at the reserve throughout the year.

Figure 2. The marsh area during construction (left) and as it now appears (right). *P.Mill*

A hedge has been planted on three sides of the DCA; the fourth side consists of a bund about 1m in height. The hedge is comprised of 50% hawthorn (*Crataegus monogyna*) and contains some 16 native species plus three species of tree (Table 2). The hedging and trees have several functions. They provide some shelter from the wind, roosting areas for adult dragonflies, habitat for small mammals, food supplies for birds and, when the hedge and trees mature, nesting sites for birds. Trees on the adjacent riverbank have been cut back to encourage foraging by adult Banded Demoiselle.

Table 2. Hedging whips and trees planted

Hedging			
Hawthorn (50%)	*Crataegus monogyna*	Small-leaved Lime	*Tilia cordata*
Alder	*Alnus glutinosa*	Spindle-tree	*Euonymus europaeus*
Alder Buckthorn	*Frangula alnus*	Wayfaring Tree	*Viburnum lantana*
Beech	*Fagus sylvatica*		
Blackthorn	*Prunus spinosa*		
Buckthorn	*Rhamnus catharticus*		
Copper Beech	*Fagus sylvatica purpurea*		
Dog Rose	*Rosa canina*	**Trees**	
Elder	*Sambucus nigra*	Bird Cherry	*Prunus padus*
Field Maple	*Acer campestre*	Crab Apple	*Malus sylvestris*
Guelder Rose	*Viburnum opulus*	Rowan	*Sorbus aucuparia*
Hazel	*Corylus avellana*		
Holly	*Ilex aquifolium*		
Hornbeam	*Carpinus betulus*		
Sessile Oak	*Quercus petraea*		

The water bodies are now well established, particularly those of phase 1. Other plants have colonised, notably Reedmace/Bulrush (*Typha latifolia*) and Common Water-plantain (*Alisma plantago-aquatica*). The former has had to be culled, especially in the marsh area, to prevent it from taking over. Canary grass (*Phalaris canariensis*) has also appeared in the marsh area and again this needs to be kept in check.

The project is a great success with 15 odonate species having been recorded already, almost half of which have bred (Table 3). Furthermore, toads, frogs and newts breed in the ponds each year. We organise dragonfly days, have an open day to demonstrate the various projects

on the reserve and frequently have someone available in the DCA throughout the flight season to talk to the public. In 2010 there were 29 visits by groups and a total of around 20,000 people visited the reserve.

Table 3. Dragonflies and Damselflies found

Azure Damselfly	*Coenagrion puella*	Breeding
Large Red Damselfly	*Pyrrhosoma nymphula*	Breeding
Blue-tailed Damselfly	*Ischnura elegans*	Breeding
Brown Hawker	*Aeshna grandis*	Breeding
Broad-bodied Chaser	*Libellula depressa*	Breeding
Common Darter	*Sympetrum striolatum*	Breeding
Banded Demoiselle	*Calopteryx splendens*	Breeding in river
Emperor Dragonfly	*Anax imperator*	Has bred
Southern Hawker	*Aeshna cyanea*	Possibly breeding
Common Blue Damselfly	*Enallagma cyathigerum*	Recorded (fig.1)
Migrant Hawker	*Aeshna mixta*	Recorded
Common Hawker	*Aeshna juncea*	Recorded
Four-spotted Chaser	*Libellula quadrimaculata*	Recorded
Black-tailed Skimmer	*Orthetrum cancellatum*	Recorded (see back cover)
Ruddy Darter	*Sympetrum sanguineum*	Recorded

YNU Notices:

YNU Annual General Meeting

This has been arranged for 19th November 2011 at the Ripon Spa Hotel, Park Street, Ripon HG4 2BU. The formal notice of the AGM, notice of elections, together with the minutes of the last AGM *etc.* will be included in the *Annual Report 2010-11*.

John Newbould
Acting General Secretary

New microscope with attached camera

As part of the grant-aid we have received from OPAL, the YNU has acquired a trinocular Brunel SP60 microscope together with a DC Musb digital camera and the software to connect to a laptop with a good graphics card. This is available to members, who may wish, for example, to provide an image of a microscopic examination for publication. Contact Paula Lightfoot, who holds the register of YNU assets for its location.

A recent Yorkshire record of the ichneumon *Scirtetes robustus*

Derek Parkinson, 11 Crow Tree Close, Baildon, Shipley, West Yorkshire, BD17 6JH

As an amateur lepidopterist, I often find larvae of butterflies and moths which I then keep until the resulting imagines emerge and the identity of the species can be confirmed. On 27th May 2011, I was initially dismayed to discover that a caterpillar of The Dun-bar (*Cosmia trapezina*) collected from woodland at Hawksworth (VC64) had perished as a result of an apparent parasitoid attack. The discarded skin of the caterpillar lay upon the oak leaf on which it had been feeding, adjacent to the point of attachment of a silk thread suspending a brownish ichneumonoid cocoon (Plate VI, Centre pages). I took a photograph of the cocoon and emailed it to Dr Mark Shaw, Honorary Research Associate at The National Museum of Scotland. Dr Shaw is the co-author of the chapter on Parasites in *The Moths and Butterflies of Great Britain and Ireland, Volume 1*, where there is a whole page illustrating different cocoons of Ichneumonidae.

The distinctive greyish banding on the brown cocoon was sufficient for Dr Shaw to be able to confidently identify the parasitoid as *Scirtetes robustus* (Ichneumonoidae: Campopleginae) This solitary endoparasite used to be called *Spudastica kriechbaumeri* and *Cosmia trapezina* is a well-known and regular host. Curiously, *Scirtetes robustus* also parasitises similar-looking, but only distantly related, *Orthosia* species feeding at the same time of year (M R Shaw 2011, pers. comm.)

On account of their often exposed situation, cocoons of the Campopleginae are especially prone to attack by pseudohyperparasites. The mature larvae of a few genera are able to cause their cocoons to jump when stimulated by light or heat (Shaw & Askew 1983). Unfortunately my specimen refused to perform despite gentle coaxing.

Bill Ely stated in his recent article *The state of the Union's ichneumon records* (Ely, 2011) that the current Yorkshire records fail to reflect the abundance of ichneumons in the county. This prompted me to send him my meagre few and he kindly replied that the only other known Yorkshire record of *Scirtetes robustus* is from an undisclosed location ('Yorks') in 1889, collected by G T Porritt and named by J B Bridgman. Bill tells me that the specimen is still in Norwich Museum and that he has no real reason to disbelieve this early record but that all C19th determinations are treated as unconfirmed, even from such an eminent worker as Bridgman, because the British list has expanded so much in the meantime (W A Ely, 2011, pers. comm.)

It is satisfying to be second only to the eminent Mr Porritt in recording this species in Yorkshire but *Scirtetes robustus* is actually a very common and widely distributed species in Britain (M R Shaw, 2011 pers. comm.) and the paucity of Yorkshire records simply reflects how few of us are studying parasitoid wasps.

References

Ely, W.A. (2011) The state of the Union's ichneumon records. *The Naturalist*, 1076, 35-39
Shaw, M.R. & Askew, R.R. (1983) *The Moths and Butterflies of Great Britain and Ireland*, Harley Books.

A further note on Hornbeam *(Carpinus betulus)* in Harrogate District

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In Newbould (2010) I reported on the discovery of the fungal gall *Taphrina carpini* at Harlow Carr (SE27875413). In the report, I reported that although Hornbeam is present at Ripley Park and its adjacent woodlands, I had not seen this gall there. In October 2009, I surveyed an area both north and south of the River Nidd for plant galls whilst walking from Ripley to Clint, then to Hampsthwaite and back to Ripley via Killinghall. During the course of this day, I found just one gall, *Aceria tenellis,* on Hornbeam – on Hollybank Lane (SE273599).

Part of this walk took me along what, I discovered later, Muir (2001) considers to be a Roman road running from Ilkley via Ripley to Aldborough (Boroughbridge area). In May 2010 the stretch of hedge along a section of Roman road in the 1km square SE2659 was surveyed by myself, Dr Judith Allinson and others as part of an OPAL training day. For the first time, in surveying over 500 hedges, I found that this track has Hornbeam as a hedgerow component on both the east and west sides of the route. The hedge is well managed and is difficult to date but significantly Miller Christie (1924) describes Hornbeam In Essex as being a tree of poorly drained clay soils, whereas Beech prefers lighter drier soils. The ground flora under these hedges (SE26585956) was dominated by Meadowsweet *Filipendula ulmara* in a part of the track which was decidedly lower and wetter than the rest.

In 2011, I decided to hold a further OPAL training day on hedge recording in the same area, concentrating on an old track to the north. This is considered to be a monastic way to Catterick according to Thorpe and Speight who wrote in the 19th century (Muir, 2001). Accompanied by Catherine White, Katie Lawrence and Michelle Dickinson, we walked to the survey site along Hollybank Lane. I was amazed to see the 'witches' brooms' of *Taphrina carpini* on two Hornbeam to the south of the track (SE27245993). These were not the large infestations of Harlow Carr illustrated opposite page 22 in Bulletin 54, but younger and more twiggy, typical of *T. betulina*. (Plate VIII, Centre pages). A third tree was seen in woodland to the north at SE27065995 and later in the day we found a fourth tree near the site of a cross, associated with the former mediaeval village of Whipley (Muir, 2001) at SE27196055 within the bounds of the park. Although this year's training day did not reveal any more Hornbeam forming a boundary hedge, to the north of Hollybank Lodge is a large Bluebell covered bank with an inside ditch forming what in other places, I have seen described as a Park Pale. The ditch is some 3m wide and 2m high, whilst the bank is of a similar size. Here young Hornbeam is present in a mixed unmanaged boundary hedge. Interestingly for historians the Ripley parish boundary is shown on the 1907 map as running to the east of (and alongside) the footpath, whereas the 1997 1:25,000 map shows the boundary running on along the ditch to the east of the bank.

Discussion

Redfern (2011) states that witches' brooms tend to be a simple enlargement of the hosts' cells coupled with an increase in air space in the plants. They are host specific and are generally less complex than animal galls. *Taphrina* is grouped in Ascomycota. *Taphrina* galls are usually caused by the infection of a young bud by spores, leading to a production of many small twigs and leaves which can, over the years, lead to a large gall similar to the ones seen at Harlow

Carr. "The fungus is present inside the broom as a perennial mycelium and produces a bloom of ascospores on the leaf."

References

Christie, M. (1924) The Hornbeam (*Carpinus betulus)* in Britain. *The Journal of Ecology*, 12, 39-94
Muir, R. (2001). *Landscape Detective – Discovering a countryside.* Windgather Press, Macclesfield.
Newbould, J.A. (2010) *Taphrina carpini* on Hornbeam in VC64 at Harlow Carr (Royal Horticultural Society Garden) Harrogate, North Yorkshire. *Bulletin of the YNU,* 54, 19-22.
Redfern, M. (2011) *Plant Galls.* Collins New Naturalist, 117, London.

Botanical Report for 2010

Compiled by **Phyl Abbott** (VC64) with contributions from Richard Middleton (VC61), Gill Smith (VC62), Donald Grant (VC63) and Linda Robinson (VC65)

Trees did particularly well in 2010 producing abundant flowers and fruit and colourful autumn foliage. The dry summer provided a good opportunity to explore the drawdown zones of some of the reservoirs, all of which had colonies of Mudwort *Limosella aquatica*. Other records of interest in each of the vice-counties are listed below.

VC61 South-east Yorkshire

Ambrosia artemisiifolia	Ragweed	bird seed alien in garden, Pocklington
Conyza floribunda	Bilbao Fleabane	Beverley J.Dews conf. E.Clement
Cyperus eragrostis	Pale Galingale	bird seed alien in garden, Bevereley R.Goulder
Cyperus eragrostis	Pale Galingale	Thwaite Hall, Cottingham R.Goulder
Primula pulverulenta	Mealy Cowslip	self seeding, Thwaite Hall, Cottingham R.Goulder
Saxifraga tridactylites	Rue-leaved Saxifrage	nr. Seaton Ross K.McDowell, G.T.D.Wilmore

VC62 North-east Yorkshire (recorders G. Smith G.S., B. Thompson B.T.)

Actaea spicata	Baneberry	SE6176 woodland, Gilling G.S. 13.5.10
Agrimonia procera	Fragrant Agrimony	SE817840 Beside track, Howl Dale B.T.
Allium oleraceum	Field Garlic	SE6973 verge, Slingsby G.S. 12.9.10
Allium scorodoprasum	Sand Leek	SE6787 verge, Starfitts Lane G.S. 12.7.10
Atropa bella-donna	Deadly Nightshade	SE7088 scrub, Hutton Common G.S. 19.6.10
Barbarea intermedia	Medium-flowered Winter-cress	SE5876 Beckside, Gilling G.S. 16.5.10
Chaenorhinum minus	Small Toadflax	SE6276 old railway, Gilling G.S. 27.7.10
Chenopodium ficifolium	Fig-leaved Goosefoot	SE725839 arable margin, Marton B.T.
Convallaria majalis	Lily-of-the-valley	SE633755 woodland near Stocking Hill Farm B.T.
Convallaria majalis	Lily-of-the-valley	SE672739 Wath Wood B.T.
Coronopus didymus	Lesser Swinecress	SE8191 lawn, Levisham station G.S. 12.7.10
Coronopus didymus	Lesser Swinecress	SE6477 old railway, Gilling G.S. 27.7.10
Cynoglossum officinale	Hound's-tongue	SE7088 trackside, Hutton Common G.S. 19.6.10
Daphne laureola	Spurge Laurel	SE5784 woodland, Ashberry G.S. 28.3.10
Filago vulgaris	Common Cudweed	SE639755 Hovingham High Wood B.T.

Gagea lutea	Yellow Star-of-Bethlehem	SE7488 woodland edge, Appleton G.S. 3.4.10
Genista anglica	Petty Whin	SE6691 intake, Sykes House G.S. 3.7.10
Hordelymus europaeus	Wood Barley	SE665868 above Hold Cauldron B.T.
Hordelymus europaeus	Wood Barley	SE818835 Hagg Wood B.T.
Impatiens noli-tangere	Touch-me-not Balsam	SE6076 woodland Gilling G.S. 12.8.10
Juncus tenuis	Slender Rush	SE639746 Hovingham High Wood B.T.
Kickxia elatine	Sharp-leaved Fluellen	SE7287 field, Spaunton G.S. 11.10.10
Lilium martagon	Martagon Lily	SE6183 woodland nr river,Helmsley G.S. 18.7.10
Mimulus guttatus	Monkeyflower	SE628824 riverbank, Helmsley G.S. 18.7.10
Narcissus pseudonarcissus	Daffodil	SE7487 woodland, Appleton G.S. 3.4.10
Ophrys insectifera	Fly Orchid	SE7088 scrub, Hutton Common G.S. 19.6.10
Orchis morio	Green-winged Orchid	SE8493 field, Horcum G.S. 23.5.10
Paris quadrifolia	Herb Paris	SE6176 woodland, Gilling G.S. 23.5.10
Platanthera bifolia	Lesser Butterfly-orchid	SE6691 intake, Sykes House G.S. 3.7.10
Pyrola minor	Common Wintergreen	SE809912 Newtondale Woods P.Popely 12.7.10
Scandix pecten-veneris	Shepherd's Needle	SE7387 field edge, Appleton G.S. 19.6.10
Scleranthus annuus	Annual Knawel	SE7287 quarry spoil, Spaunton G.S. 11.10.10
Solanum nigrum	Black Nightshade	SE7390 field, Lastingham G.S. 11.10.10
Veronica catenata	Pink Water-speedwell	SE807824 Broadmire Drain B.T.
Veronica polita	Grey Field-speedwell	SE7490 field, Lastingham G.S. 11.10.10
Viola x scabra (V. odorata x V. hirta)		SE671780 grass bank, Caulkleys bank B.T.

VC63 South-west Yorkshire (recorders D.R.Grant D.R.G., D.Proctor D.P., T.Schofield T.S.)

Hieracium argillaceum	Southern Hawkweed	SE3216 old mine site, Durkar D.R.G.
Hieracium grandidens	Grand-toothed Hawkweed	SE5519 old railway, Sprotborough D.R.G.
Hieracium vagum	Glabrous-headed Hawkweed	SE3812 Felkirk D.R.G.
Hieracium vulgatum	Common Hawkweed	SE3812 Felkirk D.R.G.
Monotropa hypopitys	Yellow Bird's-nest	SE127223 Cromwell Bottom N.R., Elland D.R.G.
Pulicaria dysenterica	Common Fleabane	SE3317 nr. Earlsheaton, Dewsbury D.R.G.
Pulicaria dysenterica	Common Fleabane	SE3317 Pugneys Country Park, Wakefield D.P.
Pyrola rotundifolia	Round-leaved Wintergreen	SE127223 Cromwell Btm NR, Elland D.R.G.
Ranunculus lingua	Greater Spearwort	SE3919 Sharlston pond, nr. Wakefield D.P.
Rubus echinatoides		SE3919 Sharlston pond, nr. Wakefield D.R.G.
Rubus warrenii		SE3919 Sharlston pond, nr. Wakefield D.R.G.
Salix repens	Creeping Willow	SE685048 Hatfield N.N.R. I.McDonald
Saponaria officinalis	Soapwort	SE3812 old mineral line, Felkirk J.Greaves
Saponaria officinalis	Soapwort	SE3901 Dearne and Dove Canal, Hemingfield T.S.

VC64 Mid-west Yorkshire

Recorders: M.Wilcox (M.W.), D.Broughton (D.B.), B.A.Tregale (B.A.T.), K.Walker (K.W.), N.Vernon(N.V.)

Species new to the vice-county in a wild situation:

Allium sativum	Garlic	SE147381 Green Lane, Baildon B.A.T., M.W.04/07/10

Bromus secalinus	Rye Brome	SE362630 Arable edge, Staveley C.Pinches, K.W. 11.8.10
Crataegus rhipidophylla	Large-sepalled Hawthorn	SE223406 Hedge, Yeadon Moor D.B. 12.6.10
Eruca vesicaria		Garden Rocket SE147381 Green Lane, Baildon B.A.T., M.W. 30.5.10
Fagopyrum esculentum	Buckwheat	SE188381 Canal wall, Apperley Bridge B.A.T., M.W. 16.10.10
Galanthus nivalis x plicatus		SE365460 Ox Close Wood, East Keswick D.B. 21.3.10
Guizotia abyssinica	Niger	SE178398 Esholt tip B.A.T., M.W. 16.10.10
Lepidium virginicum	Least Pepperwort	SE198463 from bird seed, Otley N.V., det. T.Rich 10.10
Lonicera henryi	Henry's Honeysuckle	SE141387 Above Midgeley Wood, Baildon B.A.T., M.W. 6.3.10
Nothofagus alpina	Raouli	SE175353 Beecroft Moor Plantation D.B.27.6.10
Rorippa islandica	Northern Yellow-cress	SE178398 Esholt tip B.A.T., M.W. 16.10.10
Scilla bifolia	Alpine Squill	SE082492 riverbank, Addingham N.Vernon 8.4.10
Sisyrinchium striatum	Pale Yellow-eyed-grass	SE147381 Green Ln, Baildon B.A.T., M.W. 4.7.10
Solanum physalifolium	Green Nightshade	SE178398 Esholt tip B.A.T., M.W. 23.10.10
Trigonella corniculata	Sickle-fruited Fenugreek	SE178398 Esholt tip B.A.T. M.W. 30/10/10

Second records:

Aconitum lycoctonum ssp. *vulparia*	Wolf's-bane	SD919708 riverside, Arncliffe B.Burrow, K.W. 6.7.10
Armeria maritima	Thrift	SE308504 verge of A658, Pannal P.P.Abbott, K.McDowell 15.6.10
Bromus secalinus	Rye Brome	SE316580 arable edge, Old Bilton C.Pinches, K.W. 18.8.10
Campanula cochlearifolia	Fairy's-thimble	SE220416 rock crevice, Yeadon D.B. 27.8.10
Campanula medium	Canterbury-bells	SE147381 Green Lane, Baildon B.A.T., M.W. 4.7.10
Cortaderia richardii	Early Pampas-grass	SE213446 Otley Chevin Bradford Botany Gp 11.4.10
Cotoneaster divaricatus	Spreading Cotoneaster	SE147381 Green ln, Baildon B.A.T., M.W. 4.7.10
Dianthus barbatus	Sweet-William	SE147380 B.A.T., M.W. 4.7.10
Erodium moschatum	Musk Stork's-bill	SE195434 Guiseley Moor D.B. 11.10.10
Hypericum olympicum		SE147381 Green lane, Baildon B.A.T. M.W. 4.7.10
Matthiola longipetala	Night-scented Stock	SE195379 car park, Apperley Bridge B.A.T., M.W. 5.9.10
Nicandra physalodes	Apple-of-Peru	SE178398 Esholt tip B.A.T., M.W. 16.10.10
Petroselinum crispum	Garden Parsley	SE147381 Green Lane, Baildon B.A.T., M.W. 30.5.10
Physalis alkekengi	Japanese-lantern	SE204433 bridleway, West Carlton D.B. 11.10.10
Rosa ferruginea	Red-leaved Rose	SE1146 Ilkley Moor Wharfedale Naturalists 5.8.10
Stachys byzantina	Lamb's-ear	SE219488 by Lindley Wood Reserve D.B. 28.8.10

Nationally rare and scarce native species in new tetrads:

Alchemilla glaucescens	Silky Lady's-mantle	SD870805 Beckermonds Wharfedale Naturalists 18.06.10
Alchemilla wichurae	Rock Lady's-mantle	SD979712 open woodland, Kettlewell. Bradford Botany Group, conf. M.Bradshaw 3.7.10
Alopecurus aequalis	Orange Foxtail	SE224545 Beaver Dyke Reservoir D.B. 20.8.10
Eleocharis austriaca	Northern Spike-rush	SD719753 old quarry, Ingleton B.Burrow 13.8.10
Limosella aquatica	Mudwort	SE189541 drawdown zone, Fewston Res. B.A.T., M.W. 3.7.10
Limosella aquatica	Mudwort	SE156581 drawdown zone, Thruscross Reservoir B.Brown, C.Horner, N.V. 10.7.10
Limosella aquatica	Mudwort	SE190532 drwdn zone, Swinsty Res. Bradford Botany Gp 18.8.10
Limosella aquatica	Mudwort	SE210498 drwdn zn Lindley Wood Res. B.Brown, N.V 22.7.10
Persicaria minor	Small Water-pepper	SE210498 Lindley Wood Res. B.Brown, N.V. 22.7.10
Phegopteris connectilis	Beech Fern	SD801785 Ling Gill B.Brown 13.6.10
Polemonium caeruleum	Jacob's-ladder	SE310694 garden escape, roadside, Quarry Moor Wharfedale Naturalists 01.07.10
Sorbus rupicola	Rock Whitebeam	SD990662 head of Dib Beck B.Brown, M.W. 23.6.10
Thelypteris palustris	Marsh Fern	SE226477 transplanted to Farnley Lake B.Brown, N.V. 23.9.10
Thelypteris palustris	Marsh Fern	SE070611 transplanted to Parceval Hall B.Brown, N.V. 19.6.10
Utricularia minor	Lesser Bladderwort	SD807692 Helwith Bridge last record 1885 M.W.11.10.10

VC65 North-west Yorkshire

Recorders : J.Clarke (J.C.), B.Burrow (B.B.), L.Robinson (L.R.), M. Canaway (M.C.)

Carex aquatilis	Water Sedge	NY8628 ditch, Cronkley, Teesdale F.Sarker, M.Bradshaw 1.8.10 Possibly only remaining site.
Mentha x villosa var. *alopecuroides*	Apple Mint	SD8490 beside river, Cotterdale B.B. 20.9.10

1st record since 1970

Cerastium semidecandrum	Little Mouse-ear	SD7682 below walls, Easby Abbey. L.R. 14.8.10
Mentha x gracilis	Bushy Mint	SD7684 below Dent Head Viaduct B.B., J.C., L.R.M.C., 31.7.10
Rosa x sabinii (R.spinosissima x R. mollis)		SD7684 below Dent Head viaduct B.B., M.C., J.C., L.R. 31.7.10 det. R.Maskew
Rosa x sabinii (R.spinosissima x R. mollis)		SD7682 Mossy Bottom B.B. M.C., J.C., L.R. 31.7.10 det. R.Maskew
Trichophorum x foersteri (T. cespitosum x T. germanicum)		NY8228 near White Well, Cronkley Fell M.Bradshaw 23.8.10

First records

Cardamine x zahlbruckneriana (C. flexuosa x C. hirsuta)		SE0086 road verge, West Burton B.B. 23.4.10
Cirsium x celakovskianum (C. palustre x C. arvense)		SD7684 below Dent Head Viaduct J.C. 31.7.10
Geranium rotundifolium	Round-leaved Crane's-bill	SD6492 Sedbergh J.C 1st record

Euphrasia arctica ssp. arctica	Arctic Eyebright	NY9026 meadow nr. Holwick J.O'Reilly 4.6.10 det. A.Silverside
Fallopia baldschuanica	Russian Vine	SD8292 by bridge, Cotterdale L.R 3.9.10
Spiraea japonica	*"Anthony Waterer"*	SD7684 by river below Dent Head Viaduct J.C. 31.7.10
Trachystemon orientalis	Abraham-Isaac-Jacob	SE0086 river side, West Burton L.R 23.4.10
Trichophorum x foersteri (T. cespitosum x T. germanicum)		SD8082 and SD8282 Cam Fell L.R. 16.8.10 det. M.Braithwaite
Second records		
Cirsium x celakovskianum (C. palustre x C. arvense)		SD7682 Mossy Bottom J.C. 31.7.10
Crataegus laevigata	Midland Hawthorn	SD8084 nr farm buildings J.C. S. Wynn
Euphrasia arctica ssp. *arctica*	Arctic Eyebright	NY9418 meadow, Baldersdale J.O'Reilly 11.6.10
Geranium x oxonianum (G. endressii x G. versicolor)		SE0086 nr waterfall, West Burton B.B.,J.C.,L.R., M.C. 23.4.10

Book review

The Dance of Air and Sea: how oceans, weather, and life link together by A.H. Taylor. Pp. xiv + 288, incl. b/w maps and graphs. Oxford University Press, 2011. £16.99

This book provides a fascinating, well informed account of the interactions that exist among oceans, climate and ecology. It is exceptionally interdisciplinary and enthusiastically explains and integrates scientific modelling and data with historic records. This provides a coherent picture of how large scale dynamics of the world's ocean currents and atmospheric systems interact with aquatic and terrestrial systems. In doing so, the author skilfully uses a wide range of diverse sources such as records of the Salem witch trials, drifting shipwrecks, whaling ships' logs, bell-ringers struck by lightning, pelt production in Canada and ocean phytoplankton abundance. This approach is particularly effective as it simultaneously provides evidence for the scientific concepts discussed, demonstrates the ingenuity of researchers and highlights the impact of oceanic and atmospheric processes on everyday lives.

A strong feature of the book is that in addition to providing a robust, accessible account of interactions between phenomena such as El Niño and the North Atlantic Oscillation, it explores the creativity and doggedness of a host of scientists and explorers who devoted their lives to recording aspects of ecosystems behaviour, ocean currents, water temperatures and climate. The inclusion of stories which show that in several cases our understanding of these topics has been shaped by serendipity and the author's evident admiration for other workers makes for a particularly engaging and colourful account which is interesting on many different levels. The book links the pioneering climatic scientists of the 18th and 19th centuries such as Dalton, Croll and Franklin to the more recent work undertaken by researchers such as Keeling, Sawyer Lovelock and the author's own contribution arising from some 30 years work in oceanography.

This book is likely to appeal to anybody who wishes to gain a sound knowledge of the complexity of climatic change and of how our understanding of it has evolved.

TEAC

Diptera new to Yorkshire from the Barnsley area in 2010

John Coldwell 16 Railway Cottages, Dodworth, Barnsley, S75 3JJ

My continued recording of Diptera, mainly calyptrate species, around this district during 2010 resulted in the discovery of a number of flies not listed in Andrew Grayson's unpublished manuscript of the Yorkshire fauna. One exceptional wasteground site near Haigh, at the northern edge of the Barnsley area, proved to be particularly productive with six additions to the county list. Remarkably, three of these were discovered on the 11th April within a thirty minute period of collecting.

The following nine species are additions to the Yorkshire Diptera list.

SCIOMYZIDAE
Pherbellia sordida (Hendel)
A male of this scarce but probably overlooked marsh-fly was found at Haigh, a waste ground site with a diverse mix of habitats. The common *P.cinerella* was frequent throughout the season. *P.sordida* was only added to the British list in 1990 (Perry, 1990).

ANTHOMYIIDAE
Botanophila phrenione (Séguy)
A number of specimens were swept from grassland at Haigh during May. Ackland (unpublished file) considers this to be a common species in Britain.

Egle lyneborgi Ackland & Griffiths
Single examples of males found on Sallow at Haigh and Cortonwood were confirmed by Michael Ackland. Although only recently described from the *'E.minuta'* complex (Griffiths, 2003) and only known to Ackland from Berkshire and Oxfordshire (Ackland, 2004), the latter considered that it would probably be widespread in Britain, as would appear to be the case.

Egle suwai Michelsen
Single male, Haigh identified by Michael Ackland. Another species in the *'E.minuta'* complex, only recently described (Michelsen, 2009). After determining this specimen, Ackland found two further British examples amongst his *E.minuta* material (pers. comm.).

Egle subarctica Huckett
Single male, Haigh (confirmed by D.M.Ackland). Locally common on sallows in the south of England (Ackland, Anthomyiid Pack PDF file).

Paregle atrisquama (Ringdahl)
Similar to the common *P.audacula,* a male of this rare species was swept from beneath pines by Winscar Reservoir. Hitherto only known from single records from Wales and Scotland, Ackland's conjecture (Anthomyiid Pack PDF file) that it is probably overlooked again seems justified.

MUSCIDAE
Lispocephala brachialis (Rondani)
A rare species known from very few localities; only four records since 1960 (Ball 2010 in Falk *et al.* in prep.). A female was swept from low vegetation at Haigh. A fly with a conspicuously yellowish/orange body and a grey thorax whose biology is unknown, although Falk's

suggestion that larvae probably live in running water among bryophytes, is unlikely to apply here.

SARCOPHAGIDAE
Amobia signata (Meigen)
A male of this rather rare British fly was found in an area of farmland and ancient hedgerow near Silkstone. According to the NBN Gateway atlas, there are scattered records from southern England, East Anglia and South Wales.

As a dipteran associated with the nests of aculeate hymenoptera this location hardly seems ideal although numerous old trees and fence-posts presumably provide a reasonable range of wood-nesting hosts.

TACHINIDAE
Cylindromyia interrupta (Meigen)
Found in southern England and East Anglia with isolated records from Warwickshire and North Wales. A male captured at Manvers (from a remaining patch of wasteland of what formerly constituted a vast tract of highly productive 'brownfield') greatly extends the known range of this small, rather sphecid-like tachinid.

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An article, *The beetles of Spurn peninsula: a fourth update*, by M.L. Denton, can be found on the YNU website at ynu.org.uk/The_Naturalist, as can the table of rare spiders referred to by Richard Wilson in his article on p100.

The Naturalist

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